AMERICAN GAS ASSOCIATION MONTHLY

Vol. IV No. 11

NOVEMBER, 1922

WHEN utility corporations began about twenty years ago to enlarge and consolidate, making large companies by combining several small ones, they obtained the advantage of combined operations in manufacture, distribution and finance but they neglected one of the most important elements in all commercial business, that is the personal element between the proprietor and customer. It behooves the utility today to reintroduce into its relations the personal element by education and training of its employees, the factor which has built up so many prosperous and successful concerns in this country and without which no undertaking will ever be successful; and the foundation of this personal relation between proprietor and customer is courtesy.

From the Address of
President D. D. BARNUM.

CONTENTS

VOLUME IV NOVEMBER, 1922 NUMBER 11

Address of the Chairman, Accounting Section 659
Address of the Chairman, Advertising Section 667
Address of the Chairman, Commercial Section 685
Address of the Chairman, Manufacturers Section 671
Address of the Chairman, Technical Section 691
Associations Affiliated with A. G. A. 666
Big Demand for Housewife Booklet 670
Classified Directory, Manufacturers of Gas Equipment 676
Conditions Affecting the Activity of Iron Oxide in Gas Purification 699
Facts about Gas 675
Fixed Property Records 664
Gas Fuel for Stereotype Furnaces 690
How Far Are We Justified in Applying the Cost of Service Principle in the Gas Industry 647
Install Gas Piping on All New Jobs 686
Is Your Company a Member? 658
New Advertising Service Is Popular 670
Our Service 658
Rational Substitution of Manufactured Gas and Coke for Natural Gas and Anthracie in Buffalo, N. Y. 693
Report of the Committee on Fire Insurance 662
Salesman Wanted 661
Service to the Community, Advertisement 669
Some Records 642
Statement of Ownership 704
The New Officers 655
The President's Address 643

AUTHORS

Barnum, D. D. "The President's Address" 643
Brewer, George S. "Rational Substitution of Manufactured Gas and Coke for Natural Gas and Anthracite in Buffalo, N. Y." 693
Chubb, C. N. "Address of the Chairman, Technical Section" 691
DeHart, Jr., J. S. "Address of the Chairman, Manufacturers Section" .. 671
Dunkley, W. A. "Conditions Affecting the Activity of Iron Oxide in Gas Purification" 699
Haase, Ewald "Address of the Chairman, Accounting Section" 659
Higgins, A. A. "Address of the Chairman, Advertising Section" 667
Jackson, Carl D. "How Far Are We Justified in Applying the Cost of Service Principle in the Gas Industry" 647
Leitch, R. D. "Conditions Affecting the Activity of Iron Oxide in Gas Purification" 699
Myers, P. H. "Fixed Property Records" 664
Post, A. P. "Address of the Chairman, Commercial Section" 685

FOR STATEMENTS AND OPINIONS CONTAINED IN PAPERS AND DISCUSSIONS APPEARING HEREIN, THE ASSOCIATION DOES NOT HOLD ITSELF RESPONSIBLE

AMERICAN GAS ASSOCIATION MONTHLY
342 MADISON AVENUE, NEW YORK, N. Y.
SUBSCRIPTION RATE *$3.00 PER YEAR*

Entered as Second Class Mail Matter at the Post Office at Brattleboro, Vermont, February 10th, 1922, under the Act of March 3, 1879.

American Gas Association Monthly

Vol. IV NOVEMBER, 1922 No. 11

Some Records

The Fourth Annual Convention of the Association has now passed into history as a thing accomplished. And just what sort of a history does it make? A history to be proud of or one that will be passed over with a few scant paragraphs?

Let us tell you.

First, let us say that it was a convention that made records. They fell on every side, at every turn, with a regularity that was bewildering. There were more members and guests registered than ever before—over 2600 of them. One record. There were 133 exhibitors on the Steel Pier whose displays occupied some 19,000 square feet of exhibition space. Another record. Over 3000 of the public saw our new film "Around the Clock with Gas." Still another record. The cooking demonstrations were attended by over 1000 of the public. Record number four. The banquet was attended by 800 of our members and guests. Number five. The informal dance gathered over 1000. Again the bell rings. The luncheon to the ladies was participated in by 345 of our fair sex. Record number seven. The model gas plant and bungalow were viewed by all who passed along the board walk. The attendance at the Convention sessions surpassed anything ever seen before. Never before did our manufacturers put on such comprehensive and interesting displays. And so we might go on.

But all of this is, what we might say, numerically speaking. While we are proud of these numerical records we are prouder still of what they mean.

Never in the history of the gas industry was there held such a live, interested, virile meeting. Never did our members, both gas company and manufacturer, display such a live, intense interest as they did at this convention. We are prouder of this than of all the numerical records which were established, for it is the most substantial proof that our great industry is as alive, as pulsating with energy, as healthy and as progressive as we could desire.

That is why we say that the records set by the Fourth Annual Convention will mean much in the history of our industry.

AMERICAN
GAS ASSOCIATION
MONTHLY

Vol. IV NOVEMBER, 1922 No. 11

The President's Address

Address of D. D. BARNUM, President of the American Gas Association, at the Fourth National Convention and Exhibition of the Association, Atlantic City, October 24, 1922.

IT is customary to say in regard to the Gas Industry that there never was a time when there were so many problems before us. No doubt this is true for with the broader development of our business so do our problems increase. This is as it should be, for with increased problems come increased opportunities and our opportunities at present and in the near future are very great indeed.

History has repeated itself recently in the always important matter of raw materials. Periodically we go through the throes of a shortage of some raw material and generally the serious trouble comes when we least expect it. This should teach us that the possibility of cessation of supply is liable to come at any time and the present situation does not indicate that there will be any greater stability nor any less difficulty during the next few years than we have had in the past. It is our duty to be prepared for such contingencies as we have experienced or been threatened with during the past ten years. Gas Companies with the responsibility of rendering to communities an essential service should give serious thought to the permanent storage of reserve supplies of coal and oil. The interest charges on the investment so required are an insurance, which rightly should be included in the price of gas, as it is for the benefit of those who pay it. In the storage of oil a great many companies are handicapped in not being able to build tanks in the locality where their works are situated either because of difficulty in getting permits to build or lack of space. I would commend for the consideration of such companies the building of tanks and storing oil in some place

that is accessible either by rail or water in some location where the land can be purchased cheaply, permits obtained easily, and where the works can be supplied in time of shortage by barge or truck when all other supplies fail. In the storage of coal, companies should carry large permanent reserves and replenish them in the summer. This is a national need and good policy for the consumer. With the facilities for handling coal by machinery which are available, the cost of rehandling is not large. It may be argued that coal deteriorates in storage but I believe the facts will show that a pile of coal deteriorates only on the surface or for only a few feet in and that the net loss is a small additional expense to the carrying charge.

The key to the future of the gas industry is economical, efficient and low cost generating of the gas. Experiments are going on today which give those who are working on them much hope for a material improvement in this department. At the present time it is impossible to say how far this work will go. Any company in need of more generating capacity will do well to resort to increasing their capacity with inexpensive equipment for the present and wait to see what the result will be of these new processes during the next year or two. Personally I have great hopes of decided improvements in the near future.

With the possibility of decreased cost of gas in the holder we can all easily see some of the problems that will arise. Undoubtedly we will have to adjust our minds to very much larger volumes. Our distribution systems have as a rule been designed and built to distribute gas at a comparatively low pressure. These systems at a somewhat higher pressure will in general take care of much larger volume, especially if the load is reasonably uniform. Undoubtedly a greater problem will present itself beyond the street mains,—in the supply pipes, meters and building piping.

I have heard many gas engineers say they do not wish a heating load as it would be too expensive to take care of during certain periods of the winter. I do not believe we are going to have any choice; the load is coming and we have got to take care of it. It is one of our problems and one of our great opportunities.

Our industry since the war has been principally interested in increasing sales. There are many lines of thought as to the value of advertising, salesmanship, soliciting, campaigning, etc. To my mind the most effective salesmanship is in service. Of course the word "service" covers a multitude of activities. It begins when the customer first comes and applies for a meter and it never ends; but in all our relations with our customers there is one factor that has been neglected by a great many gas companies during the past few years. When utility corporations began about twenty years ago to enlarge and consolidate, making large companies by combining several small ones, they obtained the advantage of combined operations in manufacture, distribution and finances but they neglected one of the most important elements in all commercial business, that is the personal element between the proprietor and customer. It behooves the utility today to reintroduce into its relations the personal element by education and training of its employees, the factor which has built up so many prosperous and successful

concerns in this country and without which no undertaking will ever be successful; and the foundation of this personal relation between proprietor and customer is courtesy.

The above remarks bring us to the question of education and training of employees which I believe is the key to our successful operations and dealings with the public. Again I refer to the old fashioned way of doing business and the personal relation between the employer and employee. When companies were combined and large corporations formed, operations were conducted by rules and regulations laid down by executives, heads of departments; superintendents and foremen had little or no leeway in dealings with the people under them. Naturally labor unions, grievance committees, delegations and walking delegates resulted. The average workman wishes to consider himself an individual and not one of a mass. He wishes his case to be considered apart from others. His desire is to go to the man directly over him and discuss his particular case and get a decision then and there. Small companies with an executive who knows all the men, has the authority and is in touch with each individual and can settle and take care of cases as they arise, seldom have serious labor troubles. As General Grant has said, "The best government is autocratic when the autocrat is a good man." I believe that industry as a whole has made the grievous mistake of not giving more responsibility and more authority to superintendents and foremen. They have as a rule tied him hand and foot in handling their men. In most industries and particularly the gas business the foremen are men of long years of service and are tried and true and are able to handle the men under them if given the authority. Of course certain policies must be laid down by the management and conferences of the superintendents and foremen are necessary in order that their decisions go along parallel lines. One of the principal factors in giving superintendents leeway of action is the provision for advancement of men who show merit, and the main feature in this provision is graduated scales of wages depending on length of service and upon skill of performance and in cases where I have known this to be tried it has resulted in very much improved morale.

I am going to yield to the temptation of citing one of our own experiences along this line. A year ago we made an arrangement with Boston University to conduct classes for all of our employees who in any way came in contact with the public. Over four hundred of our employees took this course, which consisted of two hours a week for eight weeks and the classes were held in the daytime, the employee being relieved of his duties so that he might attend. Business principles and business ethics, the gas company's place in business and its relation to the community, salesmanship, courtesy, good will, good workmanship and co-operation are some of the outstanding subjects included in the course, the whole purpose of which was to build the foundation for better business by contributing our part toward the building of better employees. Our business in all its branches needs humanizing and we believe that educational work of this character will go a long way to accomplish it, and we are so gratified with the results so far attained that this fall we are giving about four hundred em-

ployees an advanced course which includes salesmanship, economics, industrial relations, efficiency and economy of operation, as well as a lecture on the Constiution of the United States, which we believe everybody ought to know more about. We feel that education begins at home and that in giving our employees this opportunity we are providing the best means for educating our customers and the public and putting our business more solidly upon the foundation of public understanding and good will.

The industry today is approximately one hundred years old. The common expression is "the first hundred years are the hardest." Certainly it started wrong in the gas business in regard to the question of rates. We are now beginning to see day-light in a scientific basis of charging for gas and I cannot do better in discussing this subject than to quote an article by R. B. Brown published in the Association Monthly for August in which he says,—"No sound basis for the future development of this great industry can be established which does not include a thorough appreciation that the cost of service must be reflected in the rates granted—an opportunity must be given to adjust commercial or quantity rates without an undue amount of red tape being unwound—enough latitude must be provided in the regulation of quality of gas furnished to allow of modification of processes and use of materials not available under most of the existing regulations, and finally, recognition must be made of the principle that the best talent and initiative cannot be kept active in the service of this industry under any system of returns which deprives the workers in all ranks, as well as the investor, of any reward for better than usual operation and service to the public."

The advance the gas business has made in the last four years has to a very large extent been fostered, helped and promoted by the work of this association. It has been operated efficiently, economically and effectively and I wish to take this occasion, "as retiring President of your Association, to express my thanks to the headquarters staff for the excellent work which has been done."

How Far are We Justified in Applying the Cost of Service Principle in the Gas Industry

HON. CARL D. JACKSON, President National Association of Railway and Utility Commissioners.

An address delivered before the Fourth Annual Convention at Atlantic City, October 23 to 27th, 1922. [EDITOR'S NOTE.]

THE gas industry, over a century old and originally established for lighting purposes only, now finds its principal function in supplying this service for cooking, heating and varicus important industrial uses, while still performing lighting service. The influence of ancient rate schedules established before modern development of the industry was foreseen or understood and before cost studies or cost accounting was fully recognized continues to the present day. In 1913, a State Commission found a large gas company was serving 70% of all its consumers at a rate yielding less than the cost for service rendered, and that this 70% were consuming less than one-third of the gas distributed; that 5% of the consumers were using 30% of the gas and were, as a matter of fact, largely contributing to whatever return the company made. The case is not dissimilar to one reported in Massachusetts in 1920 where 85% of the consumers using 55% of the output were not bearing their fair share of the costs. The loss in return was being made up by the other 15%. In the latter case 55% of the customers using 25% of the output were not paying the out-of-pocket costs of the service rendered. Were similar analyses available throughout the country, there can be no doubt that the same condition would be shown in many cases.

An examination of the form of schedules in force in the various states will disclose that there is recognition both on the part of the utilities and regulating commissions of the inequity of the old gas schedules though in general the schedules still lack to a large extent adaptation to a cost curve such as is generally found in electric schedules. In practically all states provisions for minimum bills in substantial amounts are in force. Some schedules contain only a uniform charge per thousand cubic feet. There is a constantly growing number of schedules that might be designated the service or demand block rate, the Chicago type of rate under which the first 500 feet or less bears a fixed charge, which, of coure, acts also as a minimum charge. In a way this type of schedule may be said to be a compromise between the ordinary minimum bill and a two-part schedule made up of the service charge plus the charge for gas, the merits of which latter type are becoming more and more to be understood. Some form of this latter schedule is said to be in effect in 38 states in the Union, though it is not generally effective, so far as I can ascertain, in many states. Gas rate schedules containing in some

form or other the service and demand charge element come nearer than other types to applying to each customer the cost of his service, but the present development of service charge schedules with few exceptions has done no more than put into a fixed charge some portion of the direct customer costs involved in furnishing service, leaving the demand cost or a large part thereof to be distributed through charges for gas.

Under the public utilities law not only must the schedules of rates be fair, reasonable and just, but they must be non-discriminatory. A system of rates which relieves not only individuals but large classes of users from bearing their fair, equitable and just burden for the service rendered and places that burden either upon other classes or individual consumers, is a discriminatory rate schedule and contrary to public utility laws.

Changes in the cost of rendering gas service, the development of many new uses for gas and the consequent increasing demand for gas have naturally led in the past few years to intense study of gas schedules and gas costs of service. I shall not discuss in detail the methods of apportioning expenses necessary to get the costs for different classes of consumers or for different quantities of consumption. There are three main classes of costs directly affecting service. First, those directly connected with the consumer himself, his installation and property used on his premises, cost of billing, collecting, etc. These costs are appreciated at once by most customers. They can understand them. They warrant little discussion by me. The second element of cost which is readily understood is the strict output cost, the operating expense cost of manufacture and distribution, generally classified as commodity or output costs. Most of these expenses can be made clear and understandable to the layman. Finally we have the element generally designated as demand or capacity costs, and it is this element of cost which is neglected in rate schedules and little understood by the consumer, yet the neglect of these costs as a factor in rate schedules must result in unjust discrimination among consumers and is likely to result in failure of or poor service by the utility. This cost of service is not in proportion either to the number of customers or the number of cubic feet taken by customers. It consists, of course, among other costs, of the fixed charges, taxes, retirement cost and fair return to the investor on all that property necessary to serve the public which is not directly allocated to the customer himself.

A utility is entitled to earn revenues not only sufficient to cover the cost of producing its commodity or the cost of selling and rendering its service, including the cost of maintenance of its property in first class operating condition, the taxes it is obliged to pay upon its property and income and a fair amount to cover the ultimate retirement of the property as it wears out or becomes obsolete, but sufficient also for a fair return on the value of that property devoted to the public use. Some of its property is used exclusively in the production of its commodity. Other portions are placed at the disposal and use of the individual consumer and are subject to be used or not, as he chooses. That portion of the property not devoted exclusively to the individual consumer is nevertheless subject to his use and demand and the capacity of the plant that the utility must provide is

determined by the composite demand of all consumers. The manufacturing capacity must always be great enough to supply any customer whenever he may see fit to use the service, and must be sustained over such periods of time as the combined needs of all customers require. The distribution system must be ample to carry the amount of gas that the combined demand of all consumers may momentarily require. In order that the manufacture may be continuous, it is necessary that storage be provided to meet the changing hourly demands and to some extent the fluctuations from day to day. The manufacturing and distributing system are there to meet the requirements of all the various classes and individual consumers.

All of this entails charges and costs, and as said by the Pennsylvania Commission: "Such charges are based upon the fact that the plant must be kept in condition to render immediate service to each of its patrons, whether he draws upon it or not. It costs the company money to be ready at all times to render such service, for a supply of gas must be kept in the mains and pipes to the consumer's premises ready for his immediate and instant use when he desires it, notwithstanding he may not light it at all."

It is this charge and cost that has been inadequately recognized in gas schedules in general, has often been ignored by the utilities themselves and, though often recognized and appreciated by regulatory commissions, has not been given that consideration throughout the country which must be given to it if the gas industry is to prosper and render adequate service, and the consumer to get the full beneficial use of the service rendered.

To again quote from the Pennsylvania Commission: "If such charges are not imposed upon the rate payers in the form of a ready-to-serve charge, they must of necessity appear in some other form, for the gross amount which any company is permitted to obtain from its patrons is made up of two elements of service actually rendered, readiness to serve and consumption. If the readiness-to-serve charge is lower, the consumption charge must be raised, and if the readiness-to-serve charge is eliminated as a separate item, then it will be necessary to include this cost in some other form."

The individual consumer controls the amount of gas he uses. The company must be ready and able to supply that consumer whenever he wants gas, and the company must have means and manufacturing facilities adequate to meet his demands whenever he sees fit to exercise them. It must have due provision for reserve capacity. The expenses necessary for rendering service, therefore, include the expenses of this large investment for readiness to serve and these expenses largely go on day by day and month by month, whether the individual consumer exercises his right to take gas or not. It is for this service, —this readiness to render service,—the provision to render service, that the customer should pay and he should pay it in proportion as he causes the necessary investment to meet his demands.

The ordinary minimum bill is not the solution of the difficulty. If it is made large enough to cover for each class of consumers the demand and customer costs for each consumer, which it seldom is, it would only operate as a proper readiness to serve charge where there was no consumption of gas whatsoever;

and where the consumption of gas is large enough to equal the minimum bill, of course it ceases to be a readiness to serve charge at all. Some of the service charges found in different states reflect only the actual customer direct costs and reflect not at all or only in part the demand or readiness to serve charge. Such service charges are in the right direction, but they do not, as a matter of fact, cover the charge properly allocated to that customer, and the rest of the demand or service charge must be found, if at all, in the first steps of the rate schedule.

That type of rate representing in the charge for the first few hundred feet service and demand costs of the customer, the charge of course, acting also as a minimum charge, is a great improvement over the pure minimum bill charge and may or may not, according to the nature of the charge made, approximate a proper readiness to serve charge. It is true that this form of schedule will not exactly follow a cost curve, while theoretically, at least, the readiness to serve charge, with the corresponding decrease in charge for gas consumed, can be made to follow such a curve and theoretically and practically, in many instances, it is the ideal rate schedule for the large class of residential consumers. With the cost analyses which have been made during the past few years, both by utilities and by commissioners, it is not difficult to arrive at the cost of service. The cost curve will vary, of course, for different utilities and for different communities, and will be modified by various factors in different communities, but a form of schedule which will reflect the actual costs for the service rendered can be easily arrived at, and the question is, knowing what these costs are and what schedule of rates would properly reflect the cost to the various consumers, how far are we justified as a practical matter in insisting upon the complete change of schedules necessary to bring about that form of rate schedule. It may not be amiss to point out at this point that the electric industry has not always adopted for the numerous smaller residence consumers a demand and output schedule, but has adopted for such classes of consumers a block rate which to a large extent does reflect, although not with complete accuracy, the cost of service. It seems to me that there are factors, many of which must be local in their nature, which must be taken into consideration in finally determining the form of rate schedule to be made effective. Furthermore, the considerations which may affect one class of consumers will not have the same force in regard to other and different classes of consumers. The largest body of consumers will always be, so far as we can now see, the domestic consumers who use gas for cooking, heating and perhaps incidentally for lighting. This class may be roughly designated as the small consumer. While his individual demand, generally speaking, may be small, the collective demand of this class is very heavy. These consumers are in fact responsible for a large proportion of the fixed costs which the utility must incur in order to be ready to render service, and yet it is in regard to this particular class of consumers that the criticism can be most justly made that rate schedules often widely differ from the actual costs of service. Ought not this situation to be remedied, and if remedied, how? The most favored consumer is generally the one whose consumption is often negligi-

ble and seldom reaches two or three thousand feet per month.

Generally, this very small consumer receives service at an actual loss to the company, the losses being made up by the larger consumers of the residential class or by other classes of consumers. A fair proportion of this very small consuming class will be found among the apartment dwellers who are supplied with heat and hot water and whose use for gas for cooking is sporadic and occasional, yet the demand upon the company by the individual of this class of consumers may equal that of the real users of gas. A readiness to serve charge schedule would, of course, remedy this discrimination and relieve the larger users of the extra burden which they are required to carry. The form of schedule still largely used throughout the country placing consumers upon the same basis of rates for a large first block, we will say the first five to ten thousand cubic feet of gas used, can no longer be justified in the light of the knowledge which we have of the cost of service. It is a direct descendant of gas schedules made a great many years ago and does not now meet conditions as they exist. While the ordinary minimum bill may in some instances and to some extent correct this discrimination, as I have already shown, it is not at all a solution of the problem and acts unjustly and unequally as a corrective. It seems to me that the situation can be best met by the installation of a readiness to serve charge for the domestic consumer and in the alternative, where it is impracticable to accomplish this, then by the application of some such form of schedule as that used in the city of Chicago, which I have designated as service or demand block rate applying to the first few hundred feet of consumption, regardless of amount used. While it may not be practicable to bring about a form of schedule as to this class of consumers, which will for each individual of the class result in that individual paying his exact proportion of the cost of service, it is possible to frame a schedule along the lines suggested which will not only for consumers of this class, as a group, but for the individuals themselves bring about a rate charge not widely differing from the cost of the service rendered. It may in some instances perhaps be more succesfully brought about in a gradual way than through revolutionary changes in schedules wholly misunderstood. The gas company's problem and the problem of the rate fixing body is to determine how far in the direction of costs the rate schedule may go as a practical matter without defeating its purpose, and under any circumstances to get rid of discriminatory rates.

Large Consumers

The question of rate schedules is not confined to the small consumer. With the greatly increased use of gas for industrial purposes and the probability of still greater demands for large quantities for other purposes, the problem of costs and rates for all classes of consumers becomes vital. Increased use means an increased investment, large amounts of new capital and the assurance of a fair return not only to the capital already invested but capital that must be secured to give the increased facilities for increased service. It would be folly to ignore the patent fact that this assurance upon which both the prosperity of the utility and adequate service to the consumer depends can be

secured only through rate schedules based primarily on the cost of service rendered. Large users are on the one hand obligated to pay their full costs and on the other hand ought not to be required or expected to make up deficiencies in revenue properly to be paid by other classes of consumers. This does not necessarily imply that all large users must necessarily be on the same schedule, but it appears to me that some form of demand and output schedule, modified perhaps for different classes of large consumers, would be the fairest form of schedule for all large users. While it may be impracticable and unnecessary to insist upon a form of schedule for smaller users which shall as to each individually accurately reflect his exact cost, it is much more necessary in the class of large users that the form of schedule shall take into consideration individual demands and uses, as well as the demands and general costs for this class as a whole. A demand and output schedule is a readiness-to-serve schedule, which may have the additional factor that the readiness to serve charge would be based upon the individual demand instead of being based upon general class or consumer demands.

Often it happens that a few individual consumers use so much gas that each one must be treated separately in making any analysis. With small customers, differences in individual characteristics may be overlooked and the composite customer more or less dealt with as such, within the limits in which it is practicable to apply costs to rates, but the treating of the large customers as a composite customer may result in showing the cost of this service more than some customer ought to pay, and in other cases it may result in an assignment of a cent less than the amount which can reasonably be apportioned to the business.

All modern electric rate schedules recognize that the characteristics of the customers' use have a very pronounced effect upon the cost of their service, and schedules have been so designed that as the characteristics of a customer's use change, the cost of his energy also changes. In general, I think it is true that the gas schedules do not recognize these conditions. In a great many of the schedules, the only change in price is one which accompanies an increased quantity of consumption.

A form of electric schedules that did not take demands into consideration in connection with large consumers is now an anomaly. Is it not reasonable to suppose that the time will come in the gas industry when the absence of this form of schedule for large consumers will also be an anomaly? The large consumer whose only demand charge is to be fond in the first steps of the block system may or may not be paying a just demand charge. It is my opinion that if it turns out that he is paying a just demand charge, it is accident rather than otherwise. A study coming under my observation showed that some customers were using the equivalent of their maximum daily consumption for only 90 or 100 days in the year, while others used the equivalent for 350 days in the year. It is evident that the customer who uses the maximum demand only 100 days in the year cannot be paying his fixed charges if his rate per thousand cubic feet for a given quantity is the same as that of the customer who uses his maximum demand for 350 days. There are many industrial users who could without real inconvenience or sub-

stantial extra cost to themselves spread their consumption over the 24 hours instead of concentrating it, as they sometimes do, within a few hours of each day. The total number of cubic feet consumed would be the same, yet the demand of the short hour user who concentrates all of his use within a short period necessarily greatly increases the demand upon the system and causes costs which should not be overlooked in the proper rate schedule. Since distribution system design is usualy determined by short time or hourly demand, it follows that in the normal course of business there are periods during the day when the distribution system is not fully useful. If the customer's use can be so arranged as to bring up the average usefulness of the distribution system, the utility can afford to furnish service to that customer at a cheaper rate than if his use were piled on the distribution peak. The ordinary gas schedule offers no incentive for the customer to distribute his load so as to equalize the demands on the company's distribution system.

While a demand schedule would probably bring about encouraging rates to larger consumers who are willing to watch their demand and economically use the gas consumed, this would undoubtedly also be of benefit to the utility in that it might in many instances make it easier to meet competitive conditions, where the margin between the use of gas and the use of oil or other substitutes is very narrow at the present time. This form of schedule can be placed into effect without injury either to the utilities or the large consumers if the other clases of consumers are paying their fair share towards sustaining the enterprise. When we come to the large customer class, it is perfectly feasible to ascertain actual demands and the cost of doing this is not out of proportion to the benefits for all concerned. This discrimination will continue to exist so long as any large number of consumers are served on a schedule substantially departing from the cost of service rendered, thus casting an unwarranted burden upon other consumers. Whatever deviation may be justified by local or competitive conditions, both public policy and legal principles fix the limit when this discrimination is reached and in general an earnest endeavor should be made to follow the cost curve.

Automatic Adjustment of Rates for Large Consumers

A schedule based on an analysis of cost in which demand, customer and output or commodity costs are separated would reflect in its commodity portion most, if not all, of the variable elements of cost. Considerable attention has been paid in recent years to the matter of securing rate schedules which could be automatically adjusted as certain bases of prices fluctuated. In the electric business, schedules of power rates in which the energy component varies with variations in the cost of coal are not infrequent. In some the variations in the cost of labor have also been introduced. There is much to be said in favor of such automatic adjustment features in schedules of rates for gas service for large customers. Customers who are in a position to thoroughly understand the nature of the schedules on which they purchase service and the significance of the different portions of the schedules will usually recognize the fairness of having the output portion or the commodity price vary with certain deter-

mining factors. The cost of gas coal or the cost of oil or some combination of these, with the average cost of labor when properly related to their effect upon the commodity portion of the rate schedule, may properly serve as the basis for automatic adjustment. In the electric power business, such automatic adjustment has been very satisfactory in many cases because rates increased or decreased very much in the same manner as the cost to the customer of supplying his own power service would have increased or decreased. The relation of the commodity portion of these rate schedules for large customers to such elements as the cost of gas coal or gas oil may not afford as completely satisfactory a basis for automatic adjustment as has been found in the electric power schedules, but probably in most cases the fluctuation of the commodity portion of the rate with such elements as the price of gas coal or gas oil may in the long run be more satisfactory than adjustment of the rate by direct order of a regulatory body in each case. Where the rate fluctuates immediately with or closely following fluctuation in basic prices, increases and decreases in the cost of their gas service are more likely to accord with the customer's ability to pay than they will if such increases and decreases have to be delayed until definite action can be taken by a regulatory commission to fix a new rate. Furthermore, in most cases such rates seem to appeal to the customer's spirit of fairness.

There are now about 10,000,000 gas consumers in the United States. The variety of uses of gas is increasing. The volume of gas consumed greatly increases year by year. The likelihood of the use of substitutes has disappeared. The investment in this utility service is very great and must necessarily increase with increased use. There is no service which is performed which is more vital to the welfare and convenience of a large proportion of our population. The facts of cost of service are well known, or at least ascertainable. The future of the industry as well as future good service to customers depends on enlightened public policy and fair public dealing, which necessitates rate schedules which shall not be discriminatory as between different classes of customers, which will distribute the burden equitably among them and insure development along lines of greatest use and public convenience.

The pathway to success is in serving humanity. By no other means is it possible, and this truth is so plain and patent that even very simple folk recognize it.

Elbert Hubbard.

The New Officers

R. B. Brown

OUR new President, R. B. Brown, was born in Roselle, New Jersey, in 1872. He secured his primary education in his native state and after two years' experience in mechanical work, entered Lehigh University, graduating with the class of 1894.

His first position in the gas business was cadet engineer with the East River Gas Company of New York City. From there he went to the Newark Gas Company as works' foreman, serving under Alfred E. Forstall and later succeeded Mr. Forstall as works' superintendent. His next position was with the American Gas Company as general superintendent of works in charge of construction and operation at their several plants. Later he entered the employ of the Milwaukee Gas Light Company as

chief engineer and soon thereafter became general manager and chief engineer in addition to serving as vice-president and director of the West Allis Gas Company and the Wauwatosa Gas Company.

Mr. Brown was an active worker from 1909 to 1916 in the American Gas Institute, filling the offices of chairman of the Technical Committee, vice-president and director.

He is a charter member of the Wisconsin Gas Association and has served as its president, vice-president and chairman of several committees, one of them being the committee on calorimetry which made the report resulting in placing the State regulation on a B.t.u. or heat unit basis, Wisconsin being the first state to adopt this standard for gas regulation.

Mr. Brown is a member of several national engineering societies and since 1919 has been a director of the American Gas Association.

He is an active member of the Public Affairs Committee of the Milwaukee Society of Engineers and a member of the City Club, Milwaukee Athletic Club, Rotary Club, Milwaukee Club, Milwaukee Association of Commerce, National Safety Council and Director and ex-commodore of the Milwaukee Yacht Club.

J. B. Klumpp

J. B. Klumpp, Vice-President-elect, was born in Jersey City, New Jersey, and graduated from Stevens Institute of Technology in the class of 1894.

He first entered the employ of the Curtis Electric Manufacturing Company but shortly after went with the United Gas Improvement Company where he was engaged in construction work. Since that time he has been actively engaged in the gas business, acting as superintendent of the Omaha Gas Company and assisting in the operation of several other companies. In 1904 he was appointed Inspecting Engineer of the United Gas Improvement Company and in 1919 he was made Assistant General Superintendent of the Gas Department in addition.

He has always been active in Association affairs and is a member of several other gas associations as well as the American Society of Mechanical Engineers, American Institute of Electrical Engineers and the Franklin Institute of Philadelphia.

P. H. Gadsden of Philadelphia, Pa., S. E. De Frese of Chattanooga, Tenn., H. S. Reeside of Washington, D. C., J. S. DeHart, Jr. of Newark, N. J., and Wm. M. Crane of New York City, are the new members of the Board of Directors, elected to serve for two years, C. A. Munroe of Chicago, Ill., H. L. Doherty of New York City and L. R. Dutton of Jenkintown, Pa. being re-elected to serve a like term.

SEEN AT ATLANTIC CITY

Left to right—Mayor Bader, of Atlantic City, Vice-President Coolidge, D. D. Barnum, Hon. Geo. B. Cortelyou, E. S. Lyons and Oscar H. Fogg.

Is Your Company a Member?

At the close of the Convention of the American Gas Association at Atlantic City on October 27, Senator J. Frank Harper, a member of the Public Service Commission of Maryland, said:

> "After having attended the Convention of the American Gas Association at Atlantic City I cannot help feeling that membership in the Association must be of the greatest advantage to any gas company. In fact, I believe that such membership is a distinct evidence of progressive spirit.
>
> "I have been particularly impressed with the accomplishments of real value to the gas industry as a whole which have been possible only through cooperative effort. I should think membership in your Association would be almost a necessity and that no gas company could well afford to be without it."

Our Service

The following appeared in an article in The Nation's Business entiled "Service for the Common Good." (EDITOR'S NOTE).

The American Gas Association is rendering very definite service to its member companies in engineering and on such problems as industrial fuel development, heating standards, the examination of fire appliances, and gas consuming devices. Service men in the field have been known to turn a loss into a profit by the checking of meters and the discovery of a number of small losses that are preventable.

ACCOUNTING SECTION
J. W. HEINS, Chairman W. A. SAUER, Vice-Chairman
H. W. HARTMAN, Secretary

Address of the Chairman

EWALD HAASE

IT is the fourth annual convention of the American Gas Association that we are attending, and this accounting section is now in session for the purpose of discussing problems and exchanging ideas pertaining to the accounting branch of the gas utility business. This branch of the gas business comprises a long list of functions and a diversified range of activities. It has to do not only with the recording of all transactions in the construction and extension of plant, and in the operation of the same, bringing these records into the form of accounts which are to be kept scientifically, but it also deals with the gathering in of the revenue, and with questions arising as to the correctness of bills rendered for service, and all the relations with the public in connection therewith, and with reference to the character of service. It is only natural that with such a variety of activities it would be impossible in any one year to touch upon all subjects in the work of the Association, or to have such a variety in the convention program as to provide something of special interest to each and every member. It has been this year's plan to deal in subjects commanding the widest possible interest.

Building upon the foundation laid in previous years, and taking advantage of the organization in effect at the opening of the year, the aim of the section has been to advance the work along the lines begun, and to continue the work that needed to be prosecuted further, having it in mind all the time to extend the work into new fields and broaden the scope of influence so as to benefit the greatest number of members of the accounting section.

A keynote was struck at the beginning of the year that in one branch of the work in each section there would be concentration and intensive work, and accordingly that concentration was made in our section on the subject of "Consumers' Accounting," a subject in which all members and company members are interested.

While we shall have reports of the various committees (and there is no intention at this time of anticipating such reports) it may nevertheless not be out of place to refer to the fact that even outside of the membership of the committee there is work being done of an extensive character on the very problems that the committee are working on. For instance, while the committee on "Uniform Classification of Accounts" will report, that report cannot take account of the great amount of work done in various parts of the country, on the part of accountants whose companies have adopted the new classification. The work of preparing to put into operation this new classification, and of adapting it to the peculiar conditions of the various

companies, and working out a series of sub-accounts, has been in some instances a large task and should not be overlooked when reviewing the work of the members of the accounting section. Such work on the classification as is here referred to has been exchanged among companies and it has been submitted to commissions; and this matter is here referred to so that all members of the Association may feel that by coming to the committee of the accounting section they can get the benefit of whatever has been done by any member throughout the country. Mr. Meyers will report that in five states the uniform classification of accounts has been adopted, with only such minor modifications as local statutes necessitated, in Massachusetts, Utah, Virginia, Michigan and Wisconsin. For the sake of emphasis let me here repeat what will appear in that report, that favorable action on the part of commissions, in the matter of adopting the classification, depends much upon the initiative which gas companies ought to take by communicating with their commissions, expressing the desire on the company's part to adopt the classification, and see it adopted by the state.

The work of the committee on "Continuous Inventory of Fixed Capital" is of special importance just now. With the introduction of the uniform classification of accounts the continuous inventory of fixed capital is no longer of academic interest only, but becomes a necessity. More and more the actual cost of capital expended in the plant is becoming the element of great importance in the establishment of a rate base, and the importance of competent and complete, as well as convenient, records of capital expenditures cannot be overstated. Inquiries as to what has been written or published on this subject are coming in and will continue to come in to the association and its members, fully indicating how vital the work on this subject is.

The committee on "Fire Insurance Rates," of which Mr. P. A. Wilson is chairman, has kept up the important work begun in previous years, and the membership has been kept advised, through publication in the Association *Monthly* of the results of the work of this committee and other agencies. These results have produced definite financial returns, amounting in some cases under the proper conditions to a reduction of 25 per cent in insurance rates. The reports of this committee have no doubt received, and will receive, very earnest study, not only from the members of this section, but from the executives and company members.

The committee on "State Representatives," of which Mr. Sauer is chairman, will have difficulty in presenting, within the time allowed for their report, an adequate account of the vital work they are doing. They are maintaining throughout the year the contacts with members, who, for the time being, may not be active in committee work of the accounting section, but who are, and should be, interested in the work of the section. This committee has the duty of supplying articles to be contributed in the accounting section of the Association *Monthly*, and it has met this obligation well. Let us not overlook the possibilities of this committee. I desire to call attention to what seems to me a great asset to this section, and that is the close cooperation established between it and the corresponding section of the N. E. L. A. and accountants association of the American Electric Railway Association. The ac-

counting section of the N. E. L. A. is an older organization, has a larger membership than ours, and the committees had done work and brought it to a relatively completed stage before our section had progressed as far. To my mind we are to be congratulated that the heartiest cooperation exists and that the results of work accomplished and the reports of committees are freely exchanged and available to our accounting section members. Thus we have this year, among other things, the benefit in the "Customers Accounting" committee of the most elaborate committee work and report made by the accounting section of the N. E. L. A. at the last annual convention in May.

I also direct attention to a new activity that may be of interest, which has developed outside of the Association. At the convention of the Retail Credit Men's Association held in Cleveland last June, there was perfected a public utilities group. Mr. Bialecki, of the Milwaukee Gas Light Company, was elected chairman. Credits and collections are a phase of each company's work in which it cooperates with retail industries of the communities in which the company is situated. We find it advantageous to cooperate with local credit organizations and bureaus. There has, however, developed among credit men of utilities a desire to be in closer touch with the credit men of utility companies throughout the country. Perhaps this new activity is the proper channel through which the exchange of credit and collection information among public utilities can be best facilitated. This public utilities section of the Retail Credit Men's Association asks that our credit departments take cognizance of its existence, and avail themselves of the advantage of membership and its benefits.

Two notable addresses on accounting subjects will be given in the course of the sessions—one at one of the accounting sessions, by George C. Mathews, statistician of the Railroad Commission of Wisconsin, and the other in one of the general sessions by A. W. Teele, of Patterson, Teele & Dennis, New York, both authorities on the subjects they will present.

I would be ungrateful indeed if I did not here record the able and conscientious work done this year by the members of the managing committee, the regular committee members, and especially the valiant support I received from the vice chairman, Mr. J. W. Heins. I deeply appreciate it and all credit for the success of this year's work should go to them.

Salesman Wanted

We want an all round gas salesman for domestic appliances. Experience and references necessary. Straight commission and drawing account. Reply direct to company, stating experience and qualifications. Full information in first letter.

THE GAS COMPANY—E. St. Louis Illinois.

Report of the Committee on Fire Insurance

THE Committee on Fire Insurance Rates which was appointed at the beginning of the year 1922 was charged with carrying on the work begun by the First Committee on Fire Insurance appointed in 1921, and consists of the following members:

P. A. Wilson, Chairman, The United Gas Improvement Company, Philadelphia, Pa.

J. G. Reese, Consolidated Gas, Electric Light and Power Co., Baltimore, Md.

H. A. Anderson, The Peoples Gas Light and Coke Co., Chicago, Ill.

E. C. Scobell, Rochester Gas and Electric Corp., Rochester, N. Y.

R. C. Cornish, The American Gas Company, Philadelphia, Pa.

During the year 1921 the matter of rates on gas plants was taken up with a number of prominent underwriters with a view to having them reduced. In addition to figures submitted to them from member companies showing the loss experienced, the insurance companies themselves were induced to make a survey of their own records, with the result that it was agreed lower rates were in order.

This movement crystallized, during the early part of the year 1922, in the publication of a new schedule for the rating of gas plants by the Central Traction and Lighting Bureau, a central regulatory and advisory body composed of the fire insurance companies. The new schedule shows a reduction of approximately 25 per cent from the old schedule published by this bureau in 1910.

This new schedule was recommended by the Central Traction and Lighting Bureau to all rating boards throughout the country (there are about forty-two of them) and up to this time (August 1, 1922) your Chairman has been informed by the Secretary of the Bureau that the new schedule has been adopted in *all* States *except* the following:

New England States (except New Hampshire, where it has been adopted) Arizona, Texas, Mississippi, Kansas, Nevada, Utah, Montana, Idaho, California, Washington.

The work of this Committee so far this year has consisted in keeping in touch with the rating situation and advising gas companies when the new schedule has been adopted in their respective territories so that they could apply for a re-rating.

With the letter of notification was also enclosed a form asking for the amount of insurance carried, premiums paid and losses for last year. The purpose of gathering this information was two-fold; first, to continue the work started by last year's Committee, when statistics for five years were gathered; and second, to obtain, if possible, some check on the application of the new schedule. If any results are to be obtained rate-wise, in addition to the rates already obtained, it is necessary that statistics be gathered covering as long a period as possible, and that they be complete for the industry. As some difficulty was experienced in gathering statistics from all companies for a five-year period, it was thought that better results could be obtained by gathering them each year. The replies from member companies so far this year, while gratifying, are by no means as complete up to this date as they should

be. It has developed that many companies carry no insurance, or very little, and so probably feel that a response is not necessary, as they can receive no benefit from the work of this committee. However, it would seem well worth the effort involved if all companies would report their method of handling insurance for this one year at least, so that we could all know the *exact* status of the fire insurance situation.

The new rating schedule contemplates the inclusion of the *explosion of gas* hazard as well as the ordinary fire hazard, and all companies are being notified of this important fact so that an explosion clause may be included in their policies if one is not already being used.

While the work of re-rating plants under the new schedule has only recently been started, the results in a few cases that the committee knows of have been very encouraging, the reduction in these cases having met the estimated reduction of 25 per cent.

The work of gathering statistics for last year is now going on, but will probably not be completed until the close of the year.

In addition to the matter of rates, the committee has in course of preparation a standard fire insurance policy form, as there is found to be quite a lack of uniformity in the policy forms of utility companies throughout the country. The committee also contemplates some educational work along the lines of fire prevention through the medium of the A. G. A. Monthly, believing this to be the surest method to bring about further rate reductions. A form for periodical self-inspection of properties for fire hazard is a further step along the lines of fire prevention which the committee will recommend for use by utility companies.

Incivility is not a Vice of the Soul, but the effect of several Vices; of Vanity, Ignorance of Duty, Laziness, Stupidity, Distraction, Contempt of others, and Jealousy.

De La Bruyere.

Fixed Property Records

P. H. MYERS, Assistant Director, Bureau of Commercial Economics, Inc., Chicago, Ill.

AN unusual interest is being manifested at the present time by utility companies throughout the country in the subject of records of fixed property. The American Gas Association and the National Electric Light Association each have committees that are actively considering this subject, and one finds quite a number of articles bearing upon it in the various business magazines. The 1921 committee of the American Gas Association in its report states that "an overwhelming majority of the gas companies recognize the importance and advantages of such a record, and it is evident that a large number of companies are considering the matter, although they may not as yet have reached the point of a definite decision."

What is the reason behind all the interest and activity shown in this subject? Manifestly, it is that commission regulation has brought imperatively to the attention of the companies the necessity of having adequate records immediately available when needed. Such records are necessary, first to support the company's contentions in rate cases; second, to support proof of the company's investment in case of application for the issuance of securities; and third, to serve as a basis for reports required by regulatory and taxing authorities.

Even before the period of commission regulation, the companies had before them the necessity of keeping their records of investment in fixed property in such shape as to yield information when needed, (1) for determining actual cost in cases of retirement of specific items of plant; (2) for determining insurance valuations in cases of fire loss and, (3) for purposes of general company administration. Nevertheless, the need was not so pressing as it is now and the companies found it easy to argue themselves into a state of contentment with existing conditions. There may be some irritation under commission regulation, but if such regulation will have the one effect of causing a more general installation of continuous records of fixed property, a great progressive step will have been taken.

Whereas this article is not a brief in support of public utility regulation by state commissions, it should nevertheless be pointed out that in addition to stimulating an interest in continuous records of fixed property, this regulation has given an impetus to the discussion and serious consideration of such problems as depreciation, definitions of repairs and replacements, better methods of work order procedure, better methods of budgetary control, better methods of material control, better methods of reporting of time and materials, better methods of securing measurements of new construction, better methods of keeping control of property retired from plant, better control of salvage and of material issued and not used. In short, companies are giving thought to the entire problem of controlling their expenditures for construction, replacements, removals, and repairs, to the end that they may have proper control of the work from the time of the request for the issuance of the work order to the making of the entry in

the property records. Surely these are important subjects, for if it is necessary to have continuous records of fixed property, it is just as necessary to have accurate information to go into these records.

In view of the obvious advantages of such a system of fixed property records prepared from accurately compiled figures, what valid objections can be raised to its installation? Of course, the only objections are the difficulty and cost of getting the system started and the difficulty and cost of keeping it up. The experience of those companies which have already adopted fixed property records and are properly co-ordinating the procedure involved with the accounting procedure shows that the second objection is groundless.

The first objection, namely, that of the difficulty of establishnig the record in the first place, has more weight. Unfortunately many companies do not discover until they are several years old that they are in need of fixed property records. Still more unfortunately, in many instances, their methods of accounting are not such as to enable them to build up these records without undue cost. Many companies, however, within the past few years, have been obliged to arrive at a fair value of their properties for rate making purposes, and to this end they have been constrained to have careful appraisals made. Fortunate indeed are those companies that then recognized the value of fixed property records and, following the acceptance of the appraisal, installed the proper routines and forms and kept the records of their investments up to date. Those other companies that have allowed a period to elapse since the date of the appraisal will find it necessary to build up their records piece-meal unless it be they wish to have new appraisals made. For those companies that have never had an appraisal, the problem may be solved in one of three ways: to build up the records from the start, to wait for a rate case at which time there will be an appraisal, or to have an appraisal made specifically for the purpose of establishing a record.

It is no part of the purpose of this article to discuss those moot questions of actual cost versus replacement cost, of bound-book records versus card records, of figuring depreciation on each item of equipment, versus figuring it on the entire value of the property as a unit, etc. These and other details of the actual operation of the system should be decided by each individual utility on the basis of the local conditions.

The purpose of this article is rather to lay stress upon the utility and desirability (one might almost say necessity) of a system of fixed property records, and of its corollary, namely, a procedure designed to control capital expenditures and to furnish accurate figures for entries in the fixed property records. The details of the method and the difficulties of getting under way will always be present. It would seem that the thing needful is the decision to get started. Every utility that installs fixed property records will not only strengthen its own position but that of the industry as a whole.

Associations Affiliated with A. G. A.

Canadian Gas Association

Date of Affiliation—Mar. 25, 1919
Pres.—Col. D. R. Street, Ottawa Gas Co., Ottawa, Ont., Can.
Sec.-Tr.—G. W. Allen, Consumers' Gas Co., Toronto.
Conv., 1923.

Empire State Gas and Electric Association

Date of Affiliation—Nov. 21 1919
Pres.—M. J. Brayton, Utica Gas & Electric Co., Utica, N. Y.
Sec.—C. H. B. Chapin, Grand Central Terminal, New York, N. Y.
Conv., 1923.

Illinois Gas Association

Date of Affiliation—Mar. 19, 1919
Pres.—R. S. Wallace, Central Illinois Light Co., Peoria, Ill.
Sec.-Tr.—R. V. Prather, 305 Illinois Mine Workers Bldg., Springfield, Ill.
Conv., 1923.

Indiana Gas Association

Date of Affiliation—April 24, 1919
Pres.—F. B. Tracy, Central Indiana Gas Co., Muncie, Ind.
Sec.-Tr.—E. J. Burke, Citizens Gas Co., Indianapolis, Ind.
Conv., 1923.

Iowa District Gas Association

Date of Affiliation—May 21, 1919
Pres.—H. B. Maynard, Citizens Gas & Electric Co., Waterloo, Ia.
Sec.-Tr.—H. R. Sterrett, Des Moines Gas Co., Des Moines, Ia.
Conv., 1923.

Michigan Gas Association

Date of Affiliation—Sept. 18, 1919
Pres.—F. W. Seymour, Battle Creek Gas Co., Battle Creek, Mich.
Sec.-Tr.—A. G. Schroeder, Grand Rapids Gas Light Co., Grand Rapids, Mich.
Conv.,—1923.

Missouri Association of Public Utilities

Date of Affiliation—June 18, 1920
Pres.—E. R. Locke, Missouri Utilities Co., Mexico, Missouri.
Sec.-Tr.—F. D. Beardslee, 315 N. 12th St., St. Louis, Mo.
Wiley F. Corl, Chmn. Affiliation Com., Missouri Utilities Co., Mexico, Mo.
Conv., 1923.

New England Association of Gas Engineers

Date of Affiliation—Feb. 19, 1919
Pres.—V. E. Bird, Connecticut Power Co., New London, Conn.
Sec.-Tr.—J. L. Tudbury, Salem Gas Light Co., Salem, Mass.
Conv., 1923.

Gas Sales Association of New England

Date of Affiliation—Oct. 1, 1919
Gov.—F. A. Woodhead, Arlington Gas Light Co., Arlington, Mass.
Sec.—M. Bernard Webber, 150 Congress St., Boston, Mass.
Annual Meeting, 1923.

New Jersey Gas Association

Date of Affiliation—April 25, 1919
Pres.—Jacob B. Jones, Bridgeton Gas Light Co. Bridgeton, N. J.
Sec.-Tr.—H. E. Mason, Consolidated Gas Co. of N. J. Long Branch, N. J.
Conv., 1923.

Pacific Coast Gas Association

Date of Affiliation—Sept. 18, 1919
Pres.—F. S. Wade, Southern Counties Gas Co., Los Angeles, Cal.
Sec.-Tr.—W. M. Henderson, 812 Howard St., San Francisco, Cal.
Conv., 1923.

Pennsylvania Gas Association

Date of Affiliation—April 10, 1919
Pres.—Luther Gaston, Lebanon Gas & Fuel Co., Lebanon, Pa.
Sec.-Tr.—Geo. L. Cullen, Harrisburg Gas Co., Harrisburg, Pa.
Conv., 1923.

South Central Gas Association

Date of Affiliation—Oct. 15, 1919
Pres.—Frank L. Weisser, San Antonio Public Service Co., San Antonio, Texas.
Sec.-Tr.—S. J. Ballinger, San Antonio Public Service Co., San Antonio, Texas.
Conv., 1923.

Southern Gas Association

Date of Affiliation—May 20, 1919
Pres.—P. H. Gadsden, The United Gas Improvement Co., Philadelphia, Pa.
Sec.-Tr.—G. H. Smith, City Gas Co., Norfolk, Va.
Conv., 1923.

Wisconsin Utilities Association

Pres.—J. P. Pulliam, Wisconsin Public Service Co., Milwaukee, Wis.
Exec.-Sec.J. N. Cadby, 445 Washington Bldg., Madison, Wis.
Conv., 1923.

Address of the Chairman

A. A. HIGGINS

THE Publicity and Advertising Section has again enjoyed a year of splendid support from the industry with the result that we have been able to accomplish most of the things we set out to do and can now look forward to the time—and it will not be far off—when our industry will be held in universal esteem by the gas consuming public due to a better understanding of our aims and objects.

We have made the first leg of a long journey. Whether we will reach the end or not and reap the advantages which await us there, depends upon our persistence in sticking to a policy which decrees that the industry cannot be prosperous at the expense of its relations with the public. Our house is in better order at the present time than it has ever been before. Let us keep it so. But let us remember that the kind of friendship we are building with the public cannot be done too quickly—and now that we have attained some results worth while, let us not relax in our little victories but press on to the bigger ones that are ahead.

This year's work has been marked by several outstanding features which deserve mention. Stated briefly they are:

A more intimate contact with the public established through the effective use of a large number of newspaper publicity outlets.

Frequent talks and illustrated lectures on the gas business before audiences largely composed of gas consumers, resulting in a clearer understanding of the utility's function in our domestic and industrial life.

The employment of experienced newspaper men to handle public relations work. This is a movement yet in its infancy; it should be greatly encouraged.

The selling of securities to customers, which is having most beneficial results in bringing about a better understanding of the fundamentals of the utility business.

The large amount of newspaper advertising contracted for and used with marked effectiveness by the largest number of gas company and appliance makers in the history of the industry, illustrating the industry's appreciation of this modern form of selling.

The continual expansion of state committees on public utility information, with eighteen such committees in operation and their work reaching into 26 states of the Union—a movement of vital consequence to the industry.

The use of motion pictures to carry the gas message direct to the public, and it has been carried with great success.

Better quality of the direct-by-mail literature; better sales letters and a quickened commercial sense which has

placed the industry on the alert and made it aggressive.

The recognition on the part of our industry that we have in our own employees an excellent medium for distributing information and the training of employees to properly represent us.

Those are the "tools," so to speak, that the industry has at its disposal. There is no apparent necessity of adding new ones. If we will continue to recognize the importance of newspaper and magazine publicity favorable to the industry and strive to increase the repetition of such publicity; if we will continue to use paid advertising in greater volume and strive to make it carry more effective commercial and good-will messages; if we meet the public openly and tell them the facts, by word of mouth, by means of lectures and motion pictures —if we will do these things alone, and do them conscientiously and persistently, we will forever end misunderstanding and prejudice.

During the past year we have prepared and distributed several hundred thousand copies of educational pamphlets and we will keep this good work up because we have ample proof of its success. We have inaugurated a new advertising service of most promising possibilities, at a time when the industry is making new advertising history for itself. We have made a new and better film; prepared new material for lecture purposes; made our national convention a source of news for the entire country and have established relations with several news distributing agencies which can do us great good. Altogether, there has been a concentration of effort along a certain few lines in order that we might achieve what we have had in mind at the beginning; and I am glad to say that the industry is showing an interest in our work which is sure to bring rewards.

At the present moment we are endeavoring to build up an organization of public utility advertising men as a unit of the Associated Advertising Clubs of the World, and if we are successful in this, the gas industry will find itself on an advertising par with the foremost industries of the country.

With the formation of more state committees on public utility information we will see our work broadened and supported in sections of the country where it is much needed at this time. The meeting of State Directors at this Convention shows how closely the industry is tying in with this national movement and it should be supported generously throughout the country.

As I have stated before, we have finished the first leg of a long journey, and this is no time to relax our efforts. The Publicity and Advertising Section asks for your cooperation and in return it wants you to ask for its help. Let's all get together during the year ahead and put the proper emphasis on our public relations work. It has paid us well to do so this year. We can make it pay still better this coming year if we increase our efforts, always keeping in mind our goal, the ultimate universal "Good Will of the Public" toward our industry through a complete understanding of our aims and objects.

SERVICE TO THE COMMUNITY

The motto of the Rotarians reads:

"He profits most who serves best"

The Kiwanians have a splendid motto in the slogan:

"We Build"

which means that they are engaged in constructive work to upbuild the community. What better mottos are worthy of emulation than those adopted by the Rotarians and Kiwanians?

In this progressive age greater results are accomplished by the combined co-operation of the people of a community rather than by single individual efforts without concentrated direction. The growth and development of Greenville will be measured in a large degree by whatever efforts its citizens put forth in a spirit of co-operation for the benefit of the community. The Greenville Chamber of Commerce has recently put out this statement:

"The way to build a community into a fit place in which to live and for its inhabitants to be successful and happy is to first possess the natural advantages and then develop them according to sane business principles and high social standards."

Greenville, with all its splendid institutions and business enterprises has an excellent future before it, but in order to go forward and increase in population and extend its usefulness to serve the community we must be ready and willing at all times to contribute our services and give our co-operation in the fullest degree in all matters pertaining to civic welfare, that we may have a progressive, enterprising and successful city.

The Rev. Philip G. Davidson, in a recent issue in the Greenville Democrat-Times, speaking of the St. James Episcopal Church, said:

"It is not here as a denomination but as an organization for the public welfare and to lend its assistance to the noble work of other Christian bodies, of all welfare and charitable work, and to all things to make for the good of the people of Greenville."

President Charles H. Markham, of the Illinois Central Railroad, in speaking of good will, service and co-operation, has well said:

"We believe that good will is a most valuable asset to all public utilities; in fact we believe that it is one of the most valuable assets a concern can have. We are constantly seeking to promote good will among our patrons; we are doing it by attempting to render a dependable, efficient transportation service; by having officers and employees who are at all times courteous and obliging to our patrons; by giving our patrons accurate information; by co-operating with our patrons and seeking their co-operation with us. We have repeatedly appealed to our patrons to work closely with us, to support us, not only in their business, but with their friendship, to fortify us with their constructive criticism and suggestions. We have sought to create for our company, in the consciousness of our patrons, the personality embodying the highest ideals of public service. It is toward such ideals that we are constantly striving. It is our endeavor to be of constructive service to the community which we serve."

The established policy of the management of the Greenville Gas Company, as enunciated by Vice President Charles U. Gordon, is in perfect harmony with the above expressions. Mr. Gordon has said:

"In my judgment all public utilities should constantly keep in mind the fact that their success will be dependent upon their ability and desire to faithfully serve at all times to the best of their ability the community in which they are located. They should always be courteous, ever ready to give service, and always willing to co-operate with their patrons in all civic matters. The motto of the Greenville Gas Company is,

"Courtesy, Service and Co-operation"

If we want Greenville, the Metropolis of the Delta, to grow greater day by day, let us all contribute our best efforts and give our support and co-operation for the advancement of the interest of all our people.

WATCH GREENVILLE GROW.

United States Census	United States Census
1900	1920
Population	Population
7,611	11,651
United States Census	Chamber of Commerce Census
1910	1922
Population	Population
9,610	13,294

A striking example of excellent good will newspaper advertising.

Big Demand for "Housewife" Booklet

A few days after complimentary copies of our new and attractive sixteen-page booklet entitled "Hints for the Housewife" had been issued to member companies we received orders aggregating 100,000 copies. Fortunately we had previously asked our printers to make an original printing of 100,000 copies.

At the time this is written, however, we have received orders for 300,000 copies and it looks as if the booklet would reach the 500,000 mark very shortly. This is one of the most popular pieces of educational literature ever issued by the Association. Companies are urged to take advantage of the liberal offering made.

"Hints for the Housewife" is a practical booklet for the housewife, containing gas-saving hints, cooking suggestions and items of interest about the gas business. It is neatly bound in a red cover, the color red being used as the result of many experiments with colors undertaken by a leading gas company.

The purpose of the booklet is to carry a goodwill message for the gas industry directly into the home. It is especially adapted for distribution to customers and for display in sales rooms where copies can be picked up by those calling at the office. For domestic science classes and various women's organiations, it can be used with great success.

The price of the booklet is $20.00 per thousand copies, which includes the cost of printing the company's name and address on the cover. A special price of $17.50 for 10,000 copies and over is made. Ask for a copy.

New Advertising Service is Popular

The Association's new advertising copy service, the first issue of which was mailed to companies in time to reach them on October 1st, now has more than 200 subscribers. Copies of the November issue, complete with matrices or electrotypes according to the kind desired, was mailed on October 20th.

Thirteen pieces of original copy, each one illustrated, constitute the monthly service. Eight advertisements deal with appliances, four are the ever-popular "Chats" and one three-column illustrated goodwill advertisement is included. The cost of the service is $60.00 a year, payable quarterly in advance. A complimentary copy of the November issue will be mailed free to companies who are not yet subscribers, in an endeavor to have them support the project. After November 1st there will be no further complimentary copies.

MANUFACTURERS SECTION
F. A. LEMKE, Chairman G. W. PARKER, Vice-Chairman
C. W. BERGHORN, Jr., Secretary

Address of the Chairman

J. S. DEHART, JR.

IN presenting the address of your retiring chairman, it has been customary and is indeed fitting to review the work done during the past year.

At the beginning of our past fiscal year the Manufacturers Section reported a total membership of 227. During the past year we have lost 27 members through resignation and for non-payment of dues. Offsetting this loss we have taken into membership 42 members during this period, making our total membership as of October 1, 1922, 242 manufacturer companies.

About 200 prospects have been written to through headquarters. Many of those who did not act favorably on the question of membership explained it as being due to lack of funds and the general business depression at that time. It is thought therefore that with additional effort and in view of the general improvement in business conditions our outlook for an increased membership during the coming year is bright.

We have lost an esteemed member of our Association in the passing away of Mr. William McDonald who has been active in our industry for many years.

The Meter Manufacturers Division held one meeting during the year. The salient feature of this meeting was the offer of assistance given to the Technical Section Committee on Deposits in Consumers Meters by requesting all meter manufacturers to prepare and forward to that committee, data on the visible characteristics of meters returned to them for repairs. This appeal we believe has been responded to by several of our meter manufacturer company members whose cooperation deserves the mention we have given it.

We asked this division to make an investigation of the effect of lower B.t.u. standards of gas on meter diaphragms in order to be prepared to meet any conditions arising from the increasing use of heat gas now being adopted by our commissions in preference to candle power gas. We are glad to report that both in Canada and in England where lower B.t.u. gas has been in use for many years, it has had no appreciable deteriorating effect on the diaphragm.

Some time was spent in investigating the rates of bricklayers throughout the country with the purpose of securing a lower rate on gas bench builders because these men were protected from the weather in their work and made full time in all seasons of the year. It was the consensus of opinion that it will be impossible to secure any concession in rates, the nature of the work however making it attractive to men of the better grade thereby obtaining a larger production per man.

The Bench Builders Group of the Gas Apparatus Division of the Manufacturers Section presented to gas companies through publication in the A. G. A. Monthly, a standard bench of horizontal sixes. The bench builders had several meetings to which each brought a standard design and after a great deal of discussion the various dimensions were taken up one at a time, and the result of their deliberations was the Proposed Standard Specifications for Bench of Sixes.

The reasons for establishing standard dimensions are self-evident and it is desired by the bench builders that gas companies will cooperate with them by ordering renewals for new construction in accordance with these dimensions as far as possible.

The manufacturers of iron work will then be able to attempt quantity production and know that they can move their stocks more quickly. The builders will be able to estimate the cost of renewals without so much expense for templets, measurements in the field, etc.

At a joint meeting of the Exhibition Committee together with the chairmen of the divisions of this section, plans were gone over regarding the exhibition.

At this year's exhibition we have 131 exhibitors occupying more than 19,000 square feet of exhibition space. It is needless to say that this represents a larger exhibition than heretofore attempted.

It gives us pleasure to say that the Bureau of Mines and Bureau of Standards accepted our invitation to take part in the exhibition and their very interesting exhibits are now on display in the Arcade.

Our appreciation is extended to the Boston Consolidated Gas Company and those several appliance manufacturers whose interest and efforts made possible the remarkable exhibit on display on the front porches of the pier. Our thanks are also extended to the Atlantic City Gas Company who so kindly cooperated with the installation of the gas service in use on the pier, and in many other ways assisted toward the accomplishment of this convention.

An innovation in this year's exhibition activities was the distribution of a broadside featuring the exhibition of which you no doubt have all seen a copy. This poster was mailed to a selected list of about 30,000 made up of architects, plumbers, heating engineers, etc., and covered the territory west to the Mississippi River. We have issued invitations on the request of those who have applied for them in response to this circularization. We believe that the added publicity given to the industry and the interest aroused in those who attend the exhibition by our invitation warrant the expenditure of money which was required to see this plan through.

Of course, all these things were not accomplished without some misunderstandings and difficulties arising, and in view of our experience we would recommend that the serious consideration of next year's Exhibition Committee and Managing Committee be given to the question of a definite policy on allotment of exhibition space.

The control of distribution of publications in connection with our exhibition should be made the subject of study by a broadminded and representative committee of the Manufacturers Section who should recommend a policy to the Managing Committee of the Section.

Col. Fogg has called to our attention a number of expressions of the feeling

of exhibitors that our annual exhibition should be framed independently of the Association funds, and that any surplus arising to be prorated back to the exhibitors. He presented the facts to the Board of Directors and they have requested a discussion by our section and suggestion for future policy.

Your chairman believes it would be a very grave mistake to attempt in any shape or manner to unravel the consolidation which has finally been accomplished in the formation of the A. G. A. and I think it is only necessary to have the facts fully understood by the members of the Manufacturers Section to bring about a hearty approval of the present method of handling the exhibitions.

The Exhibition Committee should prepare a budget in which the receipts and expenditures will practically balance and in ordinary working there will be a small balance one way or the other which should be set up as a reserve for guidance of future committees. If there is a loss one year, by a proper accounting the committees are prepared to avoid it the following year. If there is a profit, they can locate the source and take it into consideration in the preparation of the next budget.

This year we prepared a budget of receipts and disbursements and the accounting department of the Association has kept an accurate accounting and will be ready to present a complete statement. This statement will include certain overhead charges applicable to the work of the Exhibition Committee which in former years were not considered by our secretaries in their informal statements. In deciding on a policy to follow in this matter, consideration must be given to the great amount of gratuitous assistance rendered by our gas company membership, assistance of immense value to exhibitors and which it is well nigh impossible to reduce to a dollar and cents equivalent.

The section is indeed fortunate in being able to present under its auspices at the General Session on Friday, the paper "Selling the Gas Bill" by one of the leading merchants of the country, Mr. A. C. Fuller of the Fuller Brush Company.

Mention is made in the course of his address of the use which other large industries have made of their very valuable statistics for educating the public in the realization of the enormous and valuable service rendered by these industries.

During the past year another attempt was made toward collecting data relative to the size and importance of the gas appliance manufacturing industry. One hundred and forty questionnaires were sent out to our appliance manufacturer company members on which information was requested, first, as to total investment in the gas appliance business and secondly, as to total gross revenue derived from the gas industry for 1921.

As a result of our efforts there were 32 appliance manufacturers who gave the information desired indicating a total investment in the gas business of over $9,200,000 and a total gross sales of a little over $14,000,000 for 1921. From our membership other than appliance manufacturers, 25 companies gave the information indicating a total investment of $4,700,000 and a total gross revenue from the industry of $5,300,000.

In resume, a total of 57 manufacturer company members in reply to our ques-

tionnaire have reported a total investment in the gas business of approximately $14,000,000 and a gross revenue for 1921 of over $19,000,000.

Since these 57 companies represent approximately 25 per cent of our membership it may be fair to estimate that our total manufacturer membership represents an investment in the gas business of approximately $55,000,000 and gross revenue of $75,000,000. There may be a further investment outside of our membership of as much more. You can possibly see more clearly the value of this information.

We wish again to call to the manufacturers' attention the important subject of specifications. At the present time there are three specifications, namely, gas range, flexible tubing and lighting fixtures which have been approved by the Association. The chairman of the Committee on Standardization of Gas Appliance Specifications has several reports to present at this meting. These reports will be printed in full and submitted to our manufacturer membership with the earnest solicitation by the committee for suggestions and criticisms which the committee will be glad to take under consideration. After one year or at our next annual convention these reports, amended if necessary to include any helpful suggestions that have been made, will be submitted for final approval.

During the past year numerous inquiries have been addressed to headquarters for information regarding whether or not certain ranges were made in accordance with standard specifications. Inquiries were especially persistent from a source intimately interested, both directly and through the financing of loans in large building operations.

Other than the small number of manufacturers who signed the agreement to manufacture in accordance with A. G. A. specifications issued two years ago, there is no definite nor accurate information available at headquarters as to other manufacturers who may be following these specifications. In several cases Mr. Sellman, service engineer, together with your secretary personally inspected ranges at the earnest solicitation of the prospective customer. Those points in which the construction differed from the specifications were called to the attention of the manufacturers and we are glad to say the suggestions to comply with our specifications were met with immediate attention.

It will be the purpose of this section and the Association to continue these efforts and along even broader lines to bring to the attention of manufacturers the importance and value of manufacturing appliances in accordance with approved A. G. A. specifications.

In a matter as important as this, we believe you will agree that headquarters should have available the most accurate data, and I would recommend that every appliance manufacturer advise headquarters by trade name and number which of their appliances are being manufactured in accordance with the specifications.

For the intelligent handling of other inquiries addressed to headquarters we should also have available all information regarding our member companies which they are willing to have the buying public know. The names and addresses of the various branches selling or distributing agents handling the product of our manufacturer members would be of value; the names of all

officials of each company and any other information of a similar nature.

In line with this we propose to organize at headquarters the most complete catalogue system available and to revise our Manufacturers Directory which is now published in every other issue in the A. G. A. *Monthly*.

We wish to call our manufacturers' attention to the value of our *Monthly* as a medium for the dissemination of news of interest to the industry and earnestly solicit contributions in the name of the Manufacturers Section.

Our purpose in making the recommendations is to build up our manufacturers headquarters as a bureau of information and for service and to have a membership in the Manufacturers Section of the A. G. A. mean much more than just having the privilege of exhibiting at our annual convention.

Advance copies of this report are in the hands of the chairmen of the divisions of this section and we trust they are prepared to discuss the suggestions and recommendations for which time will be allowed. We feel that these discussions will make the path of my successor less thorny and that our incoming administration will have the complete cooperation necessary for the fulfillment of our aims.

Facts About Gas

During the year 1921 the gas industry added 363,000 new customers to its service mains. This is as many persons as live in Kansas City, or Seattle or Minneapolis.

Approximately 48,000,000 persons in the United States now use gas for lighting, heating and cooking.

Last year the American people used 326 billion cubic feet of gas, an increase of 7 billion cubic feet over 1920 and 20 billion cubic feet over 1919.

Twenty-two per cent of the total amount of manufactured gas sold is used by industrial plants in more than 1,200 different ways.

Gas is now used in 7,040,000 cooking appliances, 1,570,000 water heaters, 1,268,000 space heaters and 8,800,000 incandescent burners.

It takes 69,500 miles of gas mains to supply 4,600 cities, towns and villages with gas service.

Last year the gas industry used more than 10,000,000 tons of coal and about 900,000,000 gallons of oil.

During the last ten years the gas consumption of the country was three times greater than during the preceding decade.

The first gas company in the United States was established at Baltimore in 1816. There are now 966 gas utilities in operation.

During the next two years the gas industry will carry on a tremendous building program in the financing of which there will be needed hundreds of millions of dollars of new capital.

Napoleon called gas "a big folly." Sir Walter Scott declared it to be "a pestilential innovation." Last year sales of gas touched a new high record of 326 billion cubic feet.

Classified Directory—Manufacturers of Gas Equipment

Company Members Only, American Gas Association, Inc.

ARC LAMPS (Gas)
General Gas Light Co., New York, N. Y., Kalamazoo, Mich.
Johnson Gas Appliance Co., Cedar Rapids, Iowa
Welsbach Co., Gloucester, N. J.

ASBESTOS AND MAGNESIA PRODUCTS
Johns-Manville Inc., Madison Ave. and 41st St., New York, N. Y.

BAGS (Gas Main)
Safety Gas Main Stopper Co., 523 Atlantic Ave., Brooklyn, N. Y.

BENCHES
Bartlett Hayward Co., The, Baltimore, Md.
Gas Machinery Co., Inc., The, Celeveland, Ohio
J. H. Gautier & Co., Jersey City, N. J.
Missouri Fire Brick Co., St. Louis, Mo.
Parker-Russell Minning & Mfg. Co., The, St. Louis, Mo.
Riter-Conley Co., Pittsburgh, Pa.
Russell Engineering Co., St. Louis, Mo.
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.

BENCH IRON WORK
Banner Iron Works, 4560 Shaw Ave., St. Louis, Mo.
Bartlett Hayward Co., The, Baltimore, Md.
Davis & Farnum Mfg. Co., Waltham, Mass.
Gas Machinery Co., Inc., The, Celeveland, Ohio
Improved Equipment Co., The, 24 State St., New York, N. Y.
Isbell-Porter Co., Newark, N. J.
Missouri Fire Brick Co., St. Louis, Mo.
Parker-Russell Minning & Mfg. Co., The, St. Louis, Mo.
Riter-Conley Co., Pittsburgh, Pa.
Russell Engineering Co., St. Louis, Mo.
Stacey Manufacturing Co., The, Cincinnati, Ohio
Western Gas Construction Co., The, Fort Wayne, Ind.

BLAST GATES
Steere Engineering Co., Detroit, Mich.
B. F. Sturtevant Co., Inc., Boston, Mass.

BLOWERS, BOOSTERS, EXHAUSTERS
Amercian Gas Construction Co., Newton, Ia.
American Gas Furnace Co., Elizabeth, N. J.
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Connersville Blower Co., The, Connersville, Ind.
Gas Engineering Co., Ingram Ave., Trenton, N. J.
Gas Machinery Co., Inc., The, Celeveland, Ohio
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Isbell-Porter Co., Newark, N. J.
C. M. Kemp Mfg. Co., The, Baltimore, Md.
Maxon Furnace and Engineering Co., Muncie, Ind.
Monarch Engineering & Mfg. Co., American Bldg., Baltimore, Md.
Russell Engineering Co., St. Louis, Mo.
Needham Gas Appliance Co., The Passaic, N. J.
B. F. Sturtevant Company, Hyde Park District, Boston, Mass.
Surface Combustion Co., The, 366 Gerard Ave., Bronx, N. Y.
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.
Western Gas Construction Co., The, Fort Wayne, Ind.
Wilbraham-Green Blower Co., Pottstown, Pa.

BOILERS (Gas)
Bryant Heater & Mfg. Co., The, Cleveland, Ohio, Chicago, Ill.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Gallaher Boiler Co., Laclede Gas Bldg., St. Louis, Mo.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Hugo Manufacturing Co., West Duluth, Minn.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Wm. Kane Mfg. Co., Inc., 1903 Hagert St., Philadelphia, Pa.
Kidde & Co., 103 Park Ave., New York, N. Y.
National Machine Works, Sheffield & North Ave., Chicago, Ill.
Ofeldt Gas Fired Boiler Co., Inc., The, Nyack-on-the-Hudson, N. Y.
Wales Co., The, Kalamazoo, Mich.

BOILERS (Gas for House Heating)
American Radiator Co., New York, N. Y., Chicago, Ill.
Bryant Heater & Mfg. Co., The, Cleveland, Ohio, Chicago, Ill.
Gallaher Boiler Co., Laclede Gas Bldg., St. Louis, Mo.
Kidde & Co., 103 Park Ave., New York, N. Y.
Wales Co., The, Kalamazoo, Mich.

BOILERS (Waste Heat)
American Gas Construction Co., Newton, Ia.
Bartlett Hayward Co., The, Baltimore, Md.
U. G. I. Contracting Co., The, Broad and Arch Sts., Philadelphia, Pa.

BRAKE AND FRICTION MATERIALS
Johns-Manville Inc., Madison Ave. and 41st St., New York, N. Y.

BRAZING TABLES
American Gas Furnace Co., Elizabeth, N. J.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Rathbone, Sard & Co., Albany, N. Y., Aurora, Ill.

BRICK, FIREBRICK
Gas Machinery Co., Inc., The, Cleveland, Ohio.
J. H. Gautier & Co., Jersey City, N. J.
Harbison-Walker Refractories Co., Pittsburgh, Pa.
Improved Equipment Co., The, 24 State St., New York, N. Y.
Missouri Fire Brick Co., St. Louis, Mo.
Parker-Russell Minning & Mfg. Co., The, St. Louis, Mo.
Russell Engineering Co., St. Louis, Mo.

BROILERS (Hotel)
American Stove Co., St. Louis, Mo.
Geo. M. Clark & Co., Div., Chicago, Ill.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Fuller-Warren Co., The Milwaukee, Wis.
Michigan Stove Co., The, Detroit, Mich.
Rathbone, Sard & Co., Albany, N. Y., Aurora, Ill.
Geo. D. Roper Corp., Rockford, Ill.

BURNERS (Industrial)
American Gas Appliance Co., 108 Lawrence St. Brooklyn, N. Y.
American Gas Furnace Co., Elizabeth, N. J.
Baltimore Gas Appliance & Mfg. Co., The, Baltimore, Md.

BURNERS (Industrial)—(Continued)
Century Stove & Mfg. Co., Johnstown, Pa.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Equitable Meter Co., Pittsburgh, Pa.
Fuller-Warren Co., The, Milwaukee, Wis.
Grinnell Co., Inc., Providence, R. I.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Hale Manufacturing Co., Chicago, Ill.
Charles A. Hones, Inc., Baldwin, Long Island, N. Y.
Hugo Manufacturing Co., West Duluth, Minn.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Johnson Gas Appliance Co., Cedar Rapids, Iowa
C. M. Kemp Mfg. Co., The, Baltimore, Md.
Maxon Furnace & Engineering Co., The Muncie, Ind.
Monarch Engineering & Mfg. Co., American Bldg., Baltimore, Md.
National Machine Works, Sheffield & North Aves., Chicago, Ill.
Geo. D. Roper Corp., Rockford, Ill.
Surface Combustion Co., The, 366 Gerard Ave., Bronx, N. Y.
Tappan Stove Co., The, Mansfield, Ohio
A. H. Wolff Gas Radiator Co., The, 4 Great Jones St., New York, N. Y.

BURNERS (Lighting)
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
General Gas Light Co., New York, N. Y., Kalamazoo, Mich.
Johnson Gas Appliance Co., Cedar Rapids, Iowa
Lindsay Light Co., New York, N. Y., Chicago, Ill.
Welsbach Co., Gloucester, N. J.

BY-PRODUCT OVENS
Belgian American Coke Ovens Corp., St. Louis, Mo.
By-Products Coke Corp., Chicago, Ill.
Foundation Oven Corp., Woolworth Bldg., New York, N. Y.
Gas Machinery Co., Inc., The, Cleveland, Ohio
Improved Equipment Co., The, 24 State St. New York, N. Y.
Koppers Co., The, Pittsburgh, Pa.
Parker-Russell Minning & Mfg. Co., The, St. Louis, Mo.
Semet-Solvay Co., Syracuse, N. Y.

BY-PRODUCT RECOVERY APPARATUS
Brtlett Hayward Co., The, Baltimore, Md.
Foundation Oven Corp., Woolworth Bldg., New York, N. Y.
Gas Machinery Co., Inc., The, Cleveland, Ohio
Isbell-Porter Co., Newark, N. J.
Koppers Co., The, Pittsburgh, Pa.
Steere Engineering Co., Detroit, Mich.
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.
Western Gas Construction Co., The, Fort Wayne, Ind.

CALORIMETERS
American Meter Co., Inc., New York, N. Y.
Lambert Meter Co., Inc., Bush Terminal Bldg., Brooklyn, N. Y.
Maryland Meter Works, Baltimore, Md.
D. McDonald & Co., Albany, N. Y.
Nathaniel Tufts Meter Works, 455 Commercial St., Boston, Mass.
Superior Meter Co., Bush Terminal Bldg., Brooklyn, N. Y.

CASING, TUBING (Steel)
National Tube Co., Frick Bldg., Pittsburgh, Pa.

CASTINGS (Brass, Grey Iron)
Banner Iron Works, 4560 Shaw Ave., St. Louis, Mo.
Bartlett Hayward Co., The, Baltimore, Md.
Cleveland Co-operative Stove Co., The, Cleveland, Ohio
Howard Stove Co., Beaver Falls, Pa.
S. B. Sexton Stove & Mfg., The, Baltimore, Md.
Western Gas Construction Co., The, Fort Wayne, Ind.

CEMENT, HIGH TEMPERATURE
Johns-Manville, Inc., Madison Ave. & 41st St., New York, N. Y.
Missouri Fire Brick Co., St. Louis, Mo.
Quigley Furnace Specialties Co., 25 Cortlandt St., New York, N. Y.
Russell Engineering Co., St. Louis, Mo.

CHARGING COAL
Bartlett Hayward Co., The, Baltimore, Md.
Gas Machinery Co., Inc., The, Celeveland, Ohio
Isbell-Porter Co., Newark, N. J.
Phillips, Lang & Co., Chicago, Ill.
Western Gas Construction Co., The, Fort Wayne, Ind.

CLOTHES DRYERS
Canton Clothes Dryer Co., The, Canton, Ohio

CHIMNEYS (Radical Brick)
Alphons Custodis Chimney Construction Co., Marquette Bldg., Chicago, Ill.

COAL AND COKE (Conveyors, Crushers, Screeners)
Bartlett Hayward Co., The, Baltimore, Md.
R. H. Beaumont Co., 315 Arch St., Philadelphia, Pa.
Gas Machinery Co., Inc., The, Celeveland, Ohio
Isbell-Porter Co., Newark, N. J.
Phillips, Lang & Co., Chicago, Ill.
Riter-Conley Co., Pittsburgh, Pa.
Stephens-Adamson Mfg. Co., Aurora, Ill.
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.

COAL TAR PRODUCTS & CHEMICALS
Barrett Company, The, 17 Battery Place, New York, N. Y.

COCKS (Ranges, Water Heaters, Service and Meter)
A-B Stove Co., Battle Creek, Mich.
Acme Brass Works, Detroit, Mich.
Awa Mfg. Co., The 398 Harman St., Brooklyn, N. Y.
Claus Automatic Gas Cock Co., Milwaukee, Wis.
Detroit Brass & Malleable Works, Detroit, Mich.
Geo. D. Roper Corp., Rockford, Ill.
Hays Mfg. Co., Inc., Erie, Pa.
H. Mueller Mfg. Co., New York, N. Y., Decatur, Ill.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Johnson Gas Appliance Co., Cedar Rapids, Iowa
Kitson Co., 2837 Oakford St., Philadelphia, Pa.
McRae & Roberts Co., The, Detroit, Mich.
The Merrill Company, 90 West St., New York, N. Y.
Peninsular Brass Works, Detroit, Mich.
Roberts Brass Mfg. Co., The, Detroit, Mich.
Standard Brass Works, Detroit, Mich.

COMPOUND FOR CLEANING GAS METERS AND GAS STOVES
Standard Chemical & Supply Co., Cambridge A, Mass.

COMPRESSORS
American Gas Construction Co., Newton, Ia.
C. M. Kemp Mfg. Co., The, Baltimore, Md.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Surface Combustion Co., The, 366 Gerard Ave., Bronx, N. Y.

CONDENSERS
American Gas Construction Co., Newton, Ia.
Bartlett Hayward Co., The, Baltimore, Md.
Cruse-Kemper Co., Ambler, Pa.
M. T. Davidson Co., 154 Nassau St., New York, N. Y.
Davis & Farnum Mfg. Co., Waltham, Mass.
Gas Engineering Co., Ingram Ave., Trenton, N. J.
Gas Machinery Co., Inc., The Cleveland, Ohio
Isbell-Porter Co., Newark, N. J.
Riter-Conley Co., Pittsburgh, Pa.
Russell Engineering Co., St. Louis, Mo.
Stacey Bros. Gas Construction Co., The, Cincinnati, Ohio
Stacey Manufacturing Co., The, Cincinnati, Ohio

Steere Engineering Co., Detroit, Mich.
U. G. I. Contracting Co., The, Broad & Arch Sts., Phildelphia, Pa.
Western Gas Construction Co., The, Fort Wayne, Ind.

COOKING AUXILIARIES
G. S. Blodgett Co., The, Burlington, Vt.
Commercial Gas Appliance Co., Philadelphia, Pa.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Duparquet, Huot & Moneuse Co., 108 W. 22nd St., New York, N. Y.
Fuller-Warren Co., The Milwaukee, Wis.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Johnson Gas Appliance Co., Cedar Rapids, Iowa
Geo. D. Roper Corp., Rockford, Ill.
Scott Gas Appliance Co., Bond Bldg., Washington, D. C.

COUPLINGS
S. R. Dresser Mfg. Co., Bradford, Pa.

COVERINGS (Cold Pipe, Steam Pipe, Tank and Boiler)
Armstrong Cork & Insulation Co., Pittsburgh, Pa.
Johns-Manville Inc., Madison Ave. and 41st St., New York, N. Y.

CYLINDERS (Pressure)
National Tube Co., Frick Bldg., Pittsburgh, Pa.

DECALCOMANIA PRODUCTS
Meyercord Co., Inc., The, Chamber of Commerce Bldg., Chicago, Ill.

ELECTRIC CONTROLLING DEVICES
Cutler-Hammer Mfg. Co., The, Milwaukee, Wis. New York, N. Y.

ELEVATORS
Craig Ridgway & Son Co., Coatesville, Pa.
Phillips, Lang & Co., Chicago, Ill.

EXCHANGES (Heat)
Bartlett Hayward Co., The, Baltimore, Md.
Riter-Conley Co., Pittsburgh, Pa.
Western Gas Construction Co., The, Fort Wayne, Ind.

EXPERT APPRAISAL
Steere Engineering Co., Detroit, Mich.
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.

EXTRACTORS (Tar, Dust, Fumes)
Bartlett Hayward Co., The, Baltimore, Md.
Gas Engineering Co., Ingram Ave., Trenton, N. J.
Isbell-Porter Co., Newark, N. J.
Russell Engineering Co., St. Louis, Mo.
Steere Engineering Co., Detroit, Mich.
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.
Western Gas Construction Co., The, Fort Wayne, Ind.

FITTINGS
A-B Stove Co., Battle Creek, Mich.
Acme Brass Works, Detroit, Mich.
Aws Manufacturing Co., New York, N. Y.
Bartlett Hayward Co., The, Baltimore, Md.
Banner Iron Works, 4560 Shaw Ave., St. Louis, Mo.
Claus Automatic Gas Cock Co., Milwaukee, Wis.
Davis & Farnum Mfg. Co., Waltham, Mass.
Detroit Brass & Malleable Works, Detroit, Mich.
S. R. Dresser Mfg. Co., Bradford, Pa.
Eriez Stove & Mfg. Co., Erie, Pa.
Gas Machinery Co., The, Cleveland, Ohio
Grinnell Co., Inc., Providence, R. I.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Kitson Co., 2827 Oakford St., Philadelphia, Pa.
McRae & Roberts Co., The, Detroit, Mich.
H. Mueller Mfg. Co., New York, N. Y., Decatur, Ill.
Peninsular Brass Works, Detroit, Mich.
Roberts Brass Mfg. Co., Detroit, Mich.
Geo. D. Roper Corp., Rockford, Ill.
Standard Brass Works, Detroit, Mich.
Steere Engineering Co., Detroit, Mich.
Welsbach Co., Gloucester, N. J.
Western Gas Construction Co., The, Fort Wayne, Ind.

FITTINGS (Malleable Iron)
Crane Co., Chicago, Ill.
Detroit Brass & Malleable Works, Detroit, Mich.
Geo. D. Roper Corp., Rockford, Ill.

FLASHLIGHTS AND BATTERIES
French Battery & Carbon Co., Madison, Wis.

FLEXIBLE TUBING AND ENDS
Atlantic Tubing Co., Providence, R. I.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Eastman Mfg. Co., Manitowoc, Wis.

FORGES
American Gas Furnace Co., Elizabeth, N. J.
B. F. Sturtevant Co., Inc., Boston, Mass.

FUEL BRIQUETTING
Foundation Oven Corp., Woolworth Bldg., New York, N. Y.

FUEL ECONOMIZERS
B. F. Sturtevant Co., Inc., Boston, Mass.

FURNACES
American Gas Furnace Co., Elizabeth, N. J.
Century Stove & Mfg. Co., Johnstown, Pa.
Eriez Stove & Mfg. Co., Erie, Pa.
Charles A. Hones, Inc., Baldwin, Long Island, N. Y.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Johnson Gas Applance Co., Cedar Rapids, Iowa
Maxon Furnace and Engineering Co., Muncie, Ind.
Monarch Engineering & Mfg. Co., American Bldg., Baltimore, Md.
National Machine Works, Sheffield & North Aves, Chicago, Ill.
Parker-Russell Mining & Mfg. Co., The, St. Louis, Mo.
Russell Engineering Co., St. Louis, Mo.
S. B. Sexton Stove & Mfg. Co., The, Baltimore, Md.
Surface Combustion Co., The, 366 Gerard Ave., Bronx, N. Y.

FUSES
Johns-Manville Inc., Madison Ave. and 41st St., New York. N. Y.

GAS COAL PRODUCERS
Amherst Fuel Co., Cincinnati, O.
Creech Coal Co., 733 Union Trust Bldg., Cincinnati, Ohio.
Harlan Co-operative Coal Co., Lexington, Ky.

GAS ENGINES
Bartlett Hayward Co., The, Baltimore, Md.
B. F. Sturtevant Co., Inc., Boston, Mass.

GAS ENGINE COCKS AND VALVES
Standard Brass Works, Detroit, Mich.

GAS ENGINE COCKS AND VALVES
Standard Brass Works, Detroit, Mich.

GAS IRONS
A-B Stove Co., Battle Creek, Mich.
Benson Mfg. Co., Chicago, Ill.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Johnson Gas Appliance Co., Cedar Rapids, Iowa
Milwaukee Gas Specialty Co., Milwaukee, Wis.
Strause Gas Iron Co., Philadelphia, Pa.

GAS LEAK INDICATORS
Taylor Instrument Companies, Rochester, N. Y.

GAS LOGS
Strait & Richards, Inc., Newark, N. J.

GAS MAIN BAGS AND GAS MAIN STOPPERS
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Safety Gas Main Stopper Co., 523 Atlantic Ave., Brooklyn, N. Y.

GAS MIXERS
American Gas Furnace Co., Elizabeth, N. J.
Century Stove & Mfg. Co., Johnstown, Pa.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Detroit Brass & Malleable Works, Detroit, Mich.
Eriez Stove & Mfg. Co., Erie, Pa.
Fuller-Warren Co., The, Milwaukee, Wis.
Grinnell Co., Inc., Providence, R. I.
Hale Manufacturing Co., Chicago, Ill.
Hays Manufacturing Co., Inc., Erie, Pa.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Johnson Gas Appliance Co., Cedar Rapids, Iowa.
C. M. Kemp Mfg. Co., The, Baltimore, Md.
Maxon Furnace & Engineering Co., Muncie, Ind.
Monarch Engineering & Mfg. Co., American Bldg., Baltimore, Md.
Geo. D. Roper Corp., Rockford, Ill.
Strait & Richards, Inc., Newark, N. J.
Surface Combustion Co., The, 366 Gerard Ave., Bronx, N. Y.

GAS PLANTS (Blue)
American Gas Construction Co., Newton, Ia.
Bartlett Hayward Co., The, Baltimore, Md.
Gas Engineering Co., Ingram Ave., Trenton, N. J.
Improved Equipment Co., The, 24 State St., New York, N. Y.
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.
Western Gas Construction Co., The, Fort Wayne, Ind.

GAS PLANTS (OIL)
American Gas Construction Co., Newton, Ia.
Bartlett Hayward Co., The, Baltimore, Md.

GAS PLANTS (Carburetted Water)
American Gas Construction Co., Newton, Ia.
Bartlett Hayward Co., The, Baltimore, Md.
Gas Engineering Co., Ingram Ave., Trenton, N. J.
Gas Machinery Co., Inc., The, Cleveland, Ohio.
Improved Equipment Co., The, 24 State St., New York, N. Y.
National Machine Works, Sheffield & North Aves., Chicago, Ill.
Stacey Manufacturing Co., The, Cincinnati, Ohio.
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.
Western Gas Construction Co., The, Fort Wayne, Ind.

GAS PLANTS (Coal) (Engineers)
American Gas Construction Co., Newton, Ia.
Bartlett Hayward Co., The, Baltimore, Md.
Davis & Farnum Mfg. Co., Waltham, Mass.
Gas Engineering Co., Ingram Ave., Trenton, N. J.
Gas Machinery Co., Inc., The, Cleveland, Ohio.
Improved Equipment Co., The, 24 State St., New York, N. Y.
National Machine Works, Sheffield & North Aves., Chicago, Ill.
Isbell-Porter Co., Newark, N. J.
Missouri Fire Brick Co., St. Louis, Mo.
National Machine Works, Sheffield & North Aves., Chicago, Ill.
Parker-Russell Mining & Mfg. Co., The, St. Louis, Mo.
Riter-Conley Company, Pittsburgh, Pa.
Russell Engineering Co., St. Louis, Mo.
Semet-Solvay Co., Syracuse, N. Y.
Stacey Manufacturing Co., The, Cincinnati, Ohio.
Stacey Bros. Gas Construction Co., The, Cincinnati, Ohio.
Steere Engineering Co., Detroit, Mich.
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.
Western Gas Construction Co., The, Fort Wayne, Ind.

GAS RANGE WATER HEATERS
Geo. D. Roper Corp., Rockford, Ill.

GOVERNORS, PRESSURE VACUUM & PUMP
American Gas Construction Co., Newton, Ia.
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.

HEATERS (Room)
American Stove Co., St. Louis, Mo.
Baltimore Gas Appliance & Mfg. Co., Baltimore, Md.
Century Stove & Mfg. Co., Johnstown, Pa.
Geo. M. Clark & Co., Div., Chicago, Ill.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Detroit Stove Works, Detroit, Mich.
Eriez Stove & Mfg. Co., Erie, Pa.
Estate Stove Co., Hamilton, Ohio.
General Gas Light Co., New York, N. Y., Kalamazoo, Mich.
Grinnell Co., Inc., Providence, R. I.
J. H. Grayson Mfg. Co., The, Athens, Ohio.
The Guardian Gas Appliance Co., 3409 Superior Ave., Cleveland, Ohio
Hugo Manufacturing Co., West Duluth, Minn.
Illinois Specialty Mfg. Co., Bloomington, Ill.
Kidde & Co., 103 Park Ave., New York, N. Y.
Kennedy-Toombs, Inc., 12 Eleventh Ave., New York, N. Y.
Lawson Mfg. Co., Pittsburgh, Pa.
New Process Stove Co., Div., Cleveland, Ohio.
Ohio State Stove & Mfg. Co., The, Columbus Ohio.
Reliable Stove Co. Div., Cleveland, Ohio.
Reznor Mfg. Co., Mercer, Pa.
Roberts & Mander Stove Co., Philadelphia, Pa.
Geo. D. Roper Corp., Rockford, Ill.
J. B. Slattery & Bro. Inc., 108-110 Lawrence St., Brooklyn, N. Y.
Strait & Richards, Inc., Newark, N. J.
B. F. Sturtevant Co., Inc., Boston, Mass.
Van Zandt Gas Appliance Co., St. Louis, Mo.
Welsbach Co., Gloucester, N. J.
Western Gas Construction Co., The, Fort Wayne, Ind.
Wheeling Corrugating Co., Wheeling, W. Va.
A. H. Wolff Gas Radiator Co., The, 4 Great Jones St., New York, N. Y.

HEATERS (Garage)
Gallaher Boiler Co., Laclede Gas Bldg., St. Louis, Mo.
Howard Stove Co., Beaver Falls, Pa.
Kidde & Co., 103 Park Ave., New York, N. Y.
B. F. Sturtevant Co., Inc., Boston, Mass.
Wales Co., The, Kalamazoo, Mich.

HEATERS (Pressing and Soldering Irons)
American Gas Furnace., Elizabeth, N. J.
American Stove Co., St. Louis, Mo.
Bryant Heater & Mfg. Co., The, Cleveland, Ohio, Chicago, Ill.
Geo. M. Clark & Co. Div., Chicago, Ill.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Estate Stove Co., Hamilton, Ohio
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Charles A. Homes, Inc., Baldwin, Long Island, N. Y.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Johnson Gas Appliance Co., Cedar Rapids, Iowa
Geo. D. Roper Corp., Rockford, Ill.
Strait & Richards, Inc., Newark, N. J.

HIGH PRESSURE SYSTEMS
American Gas Construction Co., Newton, Ia.
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Connersville Blower Co., The, Connersville, Ind.
Gas Machinery Co., Inc., The Cleveland, Ohio
Grinnell Co., Inc., Providence, R. I.
C. M. Kemp Mfg. Co., The, Baltimore, Md.
H. Mueller Mfg. Co., New York N. Y., Decatur, Ill.
Needham Gas Appliance Co., The, 1 S. Lafayette St., New York, N. Y.
Selas Co., Philadelphia, Pa.
Surface Combustion Co., The, 366 Gerard Ave., Bronx, N. Y.

HOLDERS (Structural Steel Works)
American Gas Construction Co., Newton, Ia.
Banner Iron Works, 4560 Shaw Ave., St. Louis Mo.

Bartlett Hayward Co., The, Baltimore, Md.
Cruse-Kemper Co., Ambler, Pa.
Davis & Farnum Mfg. Co., Waltham, Mass.
Gas Engineering Co., Ingram Ave., Trenton, N. J.
Riter-Conley Co., Pittsburgh, Pa.
Stacey Bros. Gas Construction Co., The, Cincinnati, Ohio
Stacey Manufacturing Co., The, Cincinnati, Ohio
Western Gas Construction Co., The, Fort Wayne, Ind.

HOT PLATES
American Stove Co., St. Louis, Mo.
A-B Stove Co., Battle Creek, Mich.
Baltimore Gas Appliance & Mfg. Co., The, Baltimore, Md.
Century Stove & Mfg. Co., Johnstown, Pa.
Geo. M. Clark & Co. Div., Chicago, Ill.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Detroit Stove Works, Detroit, Mich.
Elgin Stove & Oven Co., Elgin, Ill.
Erie Stove & Mfg. Co., Erie, Pa.
Fuller-Warren Co., The, Milwaukee, Wis.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Howard Stove Co., Beaver Falls, Pa.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Michigan Stove Co., The, Detroit, Mich.
Ohio State Stove & Mfg. Co., The, Columbus, Ohio
Rathbone, Sard & Co., Albany, N. Y., Aurora, Ill.
Geo. D. Roper Corp., Rockford, Ill.
J. B. Slattery & Bro., Inc., 108-110 Lawrence St., Brooklyn, N. Y.
Tappan Stove Co., The, Mansfield, Ohio
Union Stove Works, 20 Beekman St., New York, N. Y.
Weir Stove Co., Tauton, Mass.
Wheeling Corrugating Co., Wheeling, W. Va.
A. H. Wolff Gas Radiator Co., The, 4 Great Jones St., New York, N. Y.

INDUSTRIAL FLOORING
Johns-Manville Inc., Madison Ave. and 41st St., New York, N. Y.

IRONING MACHINES
American Ironing Machine Co., 168 N. Michigan Ave., Chicago, Ill.

INCINERATORS
Estate Stove Co., Hamilton, Ohio
The Guardian Gas Appliance Co., 3409 Superior Ave., Cleveland, Ohio
Ruud Mfg. Co., Pittsburgh, Pa.

INSTRUMENTS (Measuring, Testing and Recording)
American Meter Co., Inc., New York, N. Y.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, Ohio
Bristol Co., The, Waterbury, Conn.
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Equitable Meter Co., Pittsburgh, Pa.
Foxboro Co., Inc., The, Foxboro, Mass.
Lambert Meter Co., Inc., Bush Terminal Bldg., Brooklyn, N. Y.
Maryland Meter Works, Baltimore, Md.
D. McDonald & Co., Albany, N. Y.
Precision Instrument Co., 21 Halsey St., Newark, N. J.
Republic Flow Meters Co., 2240 Diversey Blvd., Chicago, Ill.
Schaeffer & Budenberg Mfg. Co., The, Brooklyn, N. Y.
Steere Engineering Co., Detroit, Mich.
Superior Meter Co., Bush Terminal, Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.
Western Gas Construction Co., The, Fort Wayne, Ind.

INSULATING MATERIALS
American Lava Corp., Chatanooga, Tenn.
Armstrong Cork & Insulation Co., Pittsburgh, Pa.
Celite Products Co., 11 Broadway, New York, N. Y.
Davis & Farnum Mfg. Co., Waltham, Mass.
Johns-Manville Inc., Madison Ave. and 41st St., New York, N. Y.
Quigley Furnace Specialties Co., 26 Cortlandt St., New York, N. Y.

KILNS (For Firing Glass, China and Pottery)
B. F. Drakenfield & Co., Inc., 50 Murray St., New York, N. Y.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Russell Engineering Co., St. Louis, Mo.
Surface Combustion Co., The, 366 Gerard Ave., Bronx, N. Y.

KILNS
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Parker-Russell Minning & Mfg. Co., The, St. Louis, Mo.
Russell Engineering Co., St. Louis, Mo.
B. F. Sturtevant Co., Inc., Boston, Mass.
Surface Combustion Co., The, 366 Gerard Ave., Bronx, N. Y.

LABORATORY (Flash and Fire Test Apparatus)
Taylor Instrument Companies, Rochester, N. Y.

LIGHTERS (Ranges)
Claus Automatic Gas Cock Co., Milwaukee, Wis.
Michigan Stove Co., The Detroit, Mich.
Milwaukee Gas Specialty Co., Milwaukee, Wis.
Geo. D. Roper Corp., Rockford, Ill.
Safety Gas Lighter Co., Lynn, Mass.
J. M. Sherwood Co., New York, N. Y.
Strause Gas Iron Co., Philadelphia, Pa.
Welsbach Co., Gloucester, N. J.

LIGHTING (Fixtures)
Salem Brothers, 122 Centre St., New York, N. Y.
Welsbach Co., Gloucester, N. J.

LIGHTING (Gas Domes, Portables, etc.)
Salem Brothers, 122 Centre St., New York, N. Y.
Welsbach Co., Gloucester, N. J.

LIGHTING (Glassware)
Salem Brothers, 122 Centre St., New York, N. Y.
Welsbach Co., Gloucester, N. J.

LIGHTING (Incidentals)
Storrs Mica Co., Owego, N. Y.

LIGHTING (Mantles)
General Gas Light Co., New York, N. Y., Kalamazoo, Mich.
Lindsay Light Co., New York, N. Y., Chicago, Ill.
Welsbach Co., Gloucester, N. J.

LUX MATERIAL
Alpha-Lux Co., Inc., 192 Front St., New York, N. Y.

METAL RECEPTACLES
American Gas Furnace Co., Elizabeth, N. J.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Charles A. Hones, Inc., Baldwin, Long Island, N. Y.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
National Machine Works, Sheffield & North Aves., Chicago, Ill.
Surface Combustion Co., The, 366 Gerard Ave., Bronx, N. Y.
United Lead Co., 111 Broadway, New York, N. Y.

METERS
American Meter Co., Inc., New York, N. Y.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, Ohio
Cleveland Gas Meter Co., Cleveland, Ohio
Connersville Blower Co., The, Connersville, Ind., New York, N. Y.
Cutler-Hammer Mfg. Co., The, Milwaukee, Wis., New York, N. Y.
Equitable Meter Co., Pittsburgh, Pa.
Foxboro Co., Inc., The, Foxboro, Mass.
John J. Griffin & Co., 1513 Race St., Philadelphia, Pa.
Helme & McIlhenny, 17th and Clearfield Sts., Philadelphia, Pa.
Lambert Meter Co., Inc., Bush Terminal Bldg., Brooklyn, N. Y.
D. McDonald & Co., Albany, N. Y.
Maryland Meter Works, Baltimore, Md.
Metric Metal Works, Erie, Pa.
Nathaniel Tufts Meter Works, 455 Commercial St., Boston, Mass.
Pittsburgh Meter Co., East Pittsburgh, Pa.
Precision Instrument Co., 21 Halsey St., Newark, N. J.
Republic Flow Meters Co., 2240 Diversey Blvd., Chicago, Ill.
Rotary Meter Co., 52 Vanderbilt Ave., New York, N. Y.
Sprague Meter Co., The, Bridgeport, Conn.
Superior Meter Co., Bush Terminal, Brooklyn, N. Y.
Taylor Instrument Companies, Rochester, N. Y.

METERS (Air and Steam)
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Pittsburgh Meter Co., East Pittsburgh, Pa.
Republic Flow Meters Co., 2240 Diversey Blvd., Chicago, Ill.
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.

METER CONNECTIONS, SEALS, Etc.
American Meter Co., Inc., New York, N. Y.
Cleveland Gas Meter Co., Cleveland, Ohio
S. R. Dresser Mfg. Co., Bradford, Pa.
Equitable Meter Co., Pittsburgh, Pa.
Helme & McIlhenny, 17th and Clearfield Sts., Philadelphia, Pa.
Lattimer Stevens Co., The, Columbus, Ohio
D. McDonald & Co., Albany, N. Y.
H. Mueller Mfg. Co., New York, N. Y., Decatur, Ill.
Nathaniel Tufts Meter Works, 455 Commercial St., Boston, Mass.
Pittsburgh Meter Co., East Pittsburgh, Pa.
Sprague Meter Co., The, Bridgeport, Conn.
Superior Meter Co., Bush Terminal, Brooklyn, N. Y.

METERS (Steam, Condensation, Gasoline, Oil, Hot and Cold Water)
Pittsburgh Meter Co., East Pittsburgh, Pa.
Republic Flow Meters Co., 2240 Diversey Blvd., Chicago, Ill.

METER PROVERS
American Meter Co., Inc., New York, N. Y.
Equitable Meter Co., Pittsburgh, Pa.
John J. Griffin & Co., Philadelphia, Pa.
Helme & McIlhenny, 17th and Clearfield Sts., Philadelphia, Pa.
Lambert Meter Co., Inc., Bush Terminal Bldg., Brooklyn, N. Y.
Maryland Meter Works, Batimore, Md.
D. McDonald & Co., Albany, N. Y.
Nathaniel Tufts Meter Works, 455 Commercial St., Boston, Mass.
Pittsburgh Meter Co., East Pittsburgh, Pa.
Superior Meter Co., Bush Terminal, Brooklyn, N. Y.

METER SEALS AND ADJUSTABLE CONNECTIONS
Lattimer-Stevens Co., The, Columbus, O.

METER SHELF
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Lattimer-Stevens Co., The, Columbus, O.

OFFICE LABOR SAVING DEVICES
Addressograph Co., Chicago, Ill.
Burroughs Adding Machine Co., Detroit, Mich.
Elliott-Fisher Co., Harrisburg, Pa.
Kalamazoo Loose-Leaf Binder Co., Kalamazoo, Mich.
Remington Typewriter Co., 374 Broadway, New York, N. Y.
Tallman, Robbins & Co., 314 Superior St., Chicago, Ill.
Underwood Typewriter Co., 30 Vesey St., New York, N. Y.

OIL (Diaphragm)
John J. Griffin & Co., 1513 Race St., Philadelphia, Pa.
Superior Meter Co., Bush Terminal Bldg., Brooklyn, N. Y.

OVENS (Baking and Cooking)
G. S. Blodgett Co., The, Burlington, Vt.
Geo. M. Clark & Co. Div., Chicago, Ill.
Wm. M. Crane Co., 16 W. 32d St., New York N. Y.
Crandall-Pettee Co., The, 150 Franklin St., New York, N. Y.
Elgin Stove & Oven Co., Elgin, Ill.
Fuller-Warren Co., The, Milwaukee, Wis.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Grinnell Co., Inc., Providence, R. I.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Meek Oven Mfg. Co., 18 W. 34th St., New York, N. Y.
Ohio State Stove & Mfg. Co., The, Columbus, Ohio
E. E. Steiner & Co., Inc., 20 Orange St., Newark, N. J.
Surface Combustion Co., The, 366 Gerard Ave., Bronx, N. Y.
Union Steel Products Co., Ltd., The, Albion Mich.
Wheeling Corrugating Co., Wheeling, W. Va.

OVENS (Annealing, Japanning, Drying, Core, etc.,
American Gas Furnace Co., Elizabeth, N. J.
Elgin Stove & Oven Co., Elgin, Ill.
Gehnrich Indirect Heat Oven Co., Inc., Long Island City, N. Y.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Grinnell Co., Inc., Providence, R. I.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Johnson Gas Appliance Co., Cedar Rapids, Iowa
C. M. Kemp Mfg. Co., The, Baltimore, Md.
Meek Oven Mfg. Co., 18 W. 34th St., New York, N. Y.
Monarch Engineering & Mfg. Co., American Bldg., Baltimore, Md.
National Machine Works, Sheffield & North Aves., Chicago, Ill.
E. E. Steiner & Co., Inc., 20 Orange St., Newark, N. J.
Surface Combustion Co., The, 366 Gerard Ave., Bronx, N. Y.
Union Steel Products Co., The, Ltd., Albion, Mich.
Wheeling Corrugating Co., Wheeling, W. Va.
Young Bros. Co., Detroit, Mich.

OVENS (Warming)
G. S. Blodgett Co., The, Burlington, Vt.
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Elgin Stove & Oven Co., Elgin, Ill.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Meek Oven Mfg. Co., 18 W. 34th St., New York, N. Y.
Geo. D. Roper Corp., Rockford, Ill.
Union Steel Products, Co., Ltd., The, Albion, Mich.
Wheeling Corrugating Co., Wheeling, W. Va.

PACKINGS (Rods, Plunger, Piston and Flange)
Johns-Manville, Inc., Madison Ave., and 41st St., New York, N. Y.

PAINT (Outside Steel Work)
Johns-Manville, Inc., Madison Ave. & 41st St., New York, N. Y.

PHOTOMETERS
American Meter Co., Inc., New York, N. Y.
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Maryland Meter Works, Baltimore, Md.
D. McDonald & Co., Albany, N. Y.
Nathaniel Tufts Meter Works, 455 Commercial St., Boston, Mass.

PIPE
Bartlett Hayward Co., The, Baltimore, Md.
Davis & Farnum Mfg. Co., Waltham, Mass.
Grinnell Co., Inc., Providence, R. I.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Riter-Conley Co., Pittsburgh, Pa.
Steere Engineering Co., Detroit, Mich.
United Lead Co., 111 Broadway, New York, N. Y.

PIPE CASTINGS AND SPECIALS
Banner Iron Works, 4560 Shaw Ave., St. Louis, Mo.
Bartlett Hayward Co., The, Baltimore, Md.
Davis & Farnum Mfg. Co., Waltham, Mass.
National Machine Works, Sheffield & North Aves., Chicago, Ill.
Isbell-Porter Co., Newark, N. J.
Gas Engineering Co., Ingram Ave., Trenton, N. J.
Stacey Manufacturing Co., The, Cincinnati, Ohio
Steere Engineering Co., Detroit, Mich.
Western Gas Construction Co., The, Fort Wayne, Ind.

PIPE CLAMPS AND SLEEVES
Davis & Farnum Mfg. Co., Waltham, Mass.
S. R. Dresser Mfg. Co., Bradford, Pa.
National Machine Works, Sheffield & North Aves., Chicago, Ill.
Steere Engineering Co., Detroit, Mich.

PIPE PACKING
Celite Products Co., 11 Broadway New York, N. Y.
Grinnell Co., Inc., Providence, R. I.
Johns-Manville, Inc., Madison Ave. & 41st St., New York, N. Y.
United Lead Co., 111 Broadway, New York, N. Y.

PIPE TOOLS (Caulking, Cutting Tapping)
Grinnell Co., Inc., Providence, R. I.
H. Mueller Mfg. Co., New York, N. Y., Decatur, Ill.
Safety Gas Main Stopper Co., 523 Atlantic Ave., Brooklyn, N. Y.
United Lead Co., 111 Broadway, New York, N. Y.

PLATE WARMERS
Wm. M. Crane Co., 16 W. 32d St., New York, N. Y.
Duparquet, Huot & Moneuse Co., 108 W. 22d St., New York, N. Y.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Geo. D. Roper Corp., Rockford, Ill.

PORCELAIN ENAMEL PARTS (Stove, Lamps, Linings, Stamping and Spinnings)
Baltimore Enamel & Novelty Co., Baltimore, Md.
Chicago Vitreous Enamel Product Co., 1407 So. 55th Court, Cicero, Ill.
Enamel Products Co., The, Cleveland, Ohio
Porcelain Enamel & Mfg. Co., The, Baltimore, Md.
Geo. D. Roper Corp., Rockford, Ill.
Union Steel Products Co. Ltd., The, Albion, Mich.

PORCELAIN ENAMEL PLANTS (Installers)
Chicago Vitreous Enamel Product Co., 1407 S. 55th Court, Cicero, Ill.
Porcelain Enamel & Mfg. Co., The, Baltimore, Md.

PRESSURE GAUGES
American Meter Co., Inc., New York, N. Y.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bryant Heater & Mfg. Co., The, Cleveland, Ohio—Chicago, Ill.
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Equitable Meter Co., Pittsburgh, Pa.
Foxboro Co., Inc., The, Foxboro, Mass.
Gas Machinery Co., Inc., The, Cleveland, Ohio.
Grinnell Co., Inc., Providence, R. I.
Maryland Meter Works, Baltimore, Md.
D. McDonald Co., Albany, N. Y.
Nathaniel Tufts Meter Works, 455 Commercial St., Boston, Mass.
National Machine Works, Sheffield & North Aves., Chicago, Ill.
Schaeffer & Budenberg Mfg. Co., The, Brooklyn, N. Y.
Superior Meter Co., Bush Terminal, Brooklyn, N. Y.
Taylor Instrument Cos., Rochester, N. Y.
Western Gas Construction Co., The, Fort Wayne, Ind.

PRESSURE GAUGES (Boiler, Naphtha, Oil, Steam Tar)
M. T. Davidson Co., 154 Nassau St., New York, N. Y.

PUMPS
American Gas Construction Co., Newton, Ia.
Connersville Blower Co., The, Connersville, Ind.
M. T. Davidson Co., 154 Nassau St., New York, N. Y.
Gas Machinery Co., Inc., The, Cleveland, Ohio.
Nathaniel Tufts Meter Works, 455 Commercial St., Boston, Mass.
Geo. D. Roper Corp., Rockford, Ill.
Superior Meter Co., Bush Terminal, Brooklyn, N. Y.
Western Gas Construction Co., The, Fort Wayne, Ind.

PURIFIERS
American Gas Construction Co., Newton, Ia.
Bartlett Hayward Co., The, Baltimore, Md.
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Cruse-Kemper Co., Ambler, Pa.
Davis & Farnum Mfg. Co., Waltham, Mass.
Gas Engineering Co., Ingram Ave., Trenton, N. J.
Gas Machinery Co., Cleveland, Ohio.
Improved Equipment Co., The, 24 State St., New York, N. Y.
Isbell-Porter Co., Newark, N. J.
Riter- Conley Co., Pittsburg, Pa.
Russell Engineering Co., St. Louis, Mo.
Stacey Bros. Gas Construction Co., The, Cincinnati, Ohio.
Stacey Manufacturing Co., The, Cincinnati, Ohio.
Steere Engineering Co., Detroit, Mich.
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.
Western Gas Construction Co., The, Fort Wayne, Ind.

PURIFIER BOX PACKING
John-Manville, Inc., Madison Ave. & 41st St., New York, N. Y.

PURIFYING MATERIALS
Alpha-Lux Co., Inc., 192 Front St., New York, N. Y.
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Gas Purifying Materials Co., Long Island City, N. Y.
J. F. Henderson Co., 1707 Commonwealth Bldg., Pittsburgh, Pa.
Iron Hydroxide Co., Paschall Station, Philadelphia, Pa.
Iron Oxide Products, Inc., 1301 S. 55th Court, Cicero, Ill.
Eph Lyon, Trust Company Bldg., Franklin, Pa.

PYROMETERS (Indicating and recording)
Foxboro Co., Inc., The, Foxboro, Mass.
Taylor Instrument Cos., Rochester, N. Y.

RADIANT HEATERS
General Gas Light Co., New York, N. Y., Kalamazoo, Mich.
J. H. Grayson Mfg. Co., The, Athens, Ohio.
Kennedy-Toombs, Inc., 126 Eleventh Ave., New York, N. Y.
Roberts and Mander Stove Co., Philadelphia, Pa.
Welsbach Co., Gloucester, N. J.

RADIATORS
American Gas Appliance Co., 108 Lawrence St., Brooklyn, N. Y.
James B. Clow & Sons, Chicago, Ill.
Wm. M. Crane Co., 16 W. 32nd St., New York, N. Y.
Eriez Stove & Mfg. Co., Erie, Pa.
Grinnell Co., Inc., Providence, R. I.
Hugo Manufacturing Co., West Duluth, Minn.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Kidde & Co., 103 Park Ave., New York, N. Y.
J. B. Slattery & Bro., Inc., 108-110 Lawrence St., Brooklyn, N. Y.
Williams Radiator Co., St. Louis, Mo.
A. H. Wolff Gas Radiator Co., The, 4 Great Jones St., New York, N. Y.

RANGES (Domestic)
A-B Stove Co., Battle Creek, Mich.
American Range & Foundry Co., Minneapolis, Minn.
American Stove Co., St. Louis, Mo.
Baltimore Gas Appliance & Mfg. Co., The, Baltimore, Md.
Bartlett & Co., Inc., Philadelphia, Pa.
Brunner Stove Co., 438 W. 164th St., New York City.
Century Stove & Mfg. Co., Johnstown, Pa.
Chambers Manufacturing Co., Shelbyville, Ind.
Geo. M. Clark & Co., Chicago, Ill.
Cleveland Co-Operative Stove Co., The Cleveland, Ohio
Comstock-Castle Stove Co., Quincy, Ill.
Wm. M. Crane Co., 16 W. 32nd St., New York, N. Y.
Cribben & Sexton Co., Chicago, Ill.
Crown Stove Works, Chicago, Ill.
Dangler Stove Co. Div., Cleveland, O.
Detroit Stove Works, Detroit, Mich.
Eriez Stove & Mfg. Co., Erie, Pa.
Estate Stove Co., The, Hamilton, O.
Fuller-Warren Co., The, Milwaukee, Wis.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Home Stove & Foundry Co., Chicago, Ill.
Howard Stove Co., Beaver Falls, Pa.
Magee Furnace Co., 38 Union St., Boston, Mass.
Malleable Iron Range Co., Beaver Dam, Wis.
Michigan Stove Co., The, Detroit, Mich.
Moffats, Limited, Weston, Ont., Can.
National Stove Co. Div., Lorain, O.
New Process Stove Co. Div., Cleveland, O.
Ohio State Stove & Mfg. Co., Columbus, O.
Peerless Mfg. Co., Louisville, Ky.
Peninsular Stove Co., The, Detroit, Mich.
Philadelphia Stove Co., Philadelphia, Pa.
Phillips & Clark Stove Co., Inc., Geneva, N. Y.
Quick Meal Stove Co. Div., St. Louis, Mo.
Rathbone, Sard & Co., Albany, N. Y., Aurora, Ill.
Reliable Stove Co. Div., Cleveland, O.
Roberts & Mander Stove Co., Philadelphia, Pa.
Geo. D. Roper Corp., Rockford, Ill.
Scott Gas Appliance Co. Inc., Bond Bldg., Washington, D. C.
Security Stove & Mfg. Co., Kansas City, Mo.
S. B. Sexton Stove & Mfg. Co., The, Baltimore Md.
J. M. Sherwood Co., 154 Chambers St., New York, N. Y.
Tappan Stove Co., The, Mansfield, Ohio.
Trenkamp Stove & Mfg. Co., The, Cleveland, O.
Union Stove Works, 70 Beekman St., New York, N. Y.
Vesta Gas Range & Mfg. Co., Chattanooga, Tenn.
Walker & Pratt Mfg. Co., Boston, Mass.
The Wehrle Co., Newark, O.
Weir Stove Co., Taunton, Mass.
Wheeling Corrugating Co., Wheeling, W. Va.
Wincroft Stove Works, Middletown, Pa.
A. H. Wolff Gas Radiator Co., The, New York, N. Y.

RANGES (Hotel)
American Stove Co., St. Louis, Mo.
Baltimore Gas Appliance & Mfg. Co., The, Baltimore, Md.
Geo. M. Clark & Co. Div., Chicago, Ill.
Comstock-Castle Stove Co., Quincy, Ill.
Abram Cox Stove Co., Philadelphia, Pa.
Detroit Stove Works, Detroit, Mich.
Wm. M. Crane Co., 16 W. 32nd St., New York, N. Y.
Duparquet, Huot & Moneuse Co., 108 W. 22nd St., New York, N. Y.
Estate Stove Co., The, Hamilton, O.
Fuller-Warren Co., The, Milwaukee, Wis.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Michigan Stove Co., The, Detroit, Mich.
Roberts & Mander Stove Co., Philadelphia, Pa.
Geo. D. Roper, Corp., Rockfor, Ill.
S. B. Sexton Stove & Mfg. Co., The, Baltimore, Md.

REFRACTORY MATERIALS
J. H. Gautier & Co., Jersey City, N. J.
Harbison-Walker Refractories Co., Pittsburgh, Pa.
Improved Equipment Co., The, 24 State St., New York, N. Y.
Johns-Manville Inc., Madison Ave. & 41st St., New York, N. Y.
Missouri Fire Brick Co., St. Louis, Mo.
Monarch Engineering & Mfg. Co., American Bldg., Baltimore, Md.
Parker-Russell Mining & Mfg. Co., The, St. Louis, Mo.
Quigley Furnace Specialties Co., 26 Cortlandt St., New York, N. Y.
Riter-Conley Co., Pittsburgh, Pa.
Russell Engineering Co., St. Louis, Mo.
G. F. Schmidt, Chicago, Ill.
United States Refractories Corp., Mount Union, Pa.

REGULATORS (Governors)
American Gas Construction Co., Newton, Ia.
Chaplin-Fulton Mfg. Co., The, Pittsburgh, Pa.
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Connersville Blower Co., The, Connersville, Ind.
Equitable Meter Co., Pittsburgh, Pa.
Gas Machinery Co., Inc., The, Cleveland, Ohio
Improved Equipment Co., The, 24 State St., New York, N. Y.
Isbell-Porter Co., Newark, N. J.
H. Mueller Mfg. Co., New York, N. Y., Decatur, Ill.
National Machine Works, Sheffield & North Aves., Chicago, Ill.
Reynolds Gas Regulator Co., Anderson, Ind.
Sprague Meter Co., The, Bridgeport, Conn.
Steere Engineering Co., Detroit, Mich.
Western Gas Construction Co., The, Fort Wayne, Ind.

REPAIRS (Gas Meters and Appliances)
Helme & McIlhenny, 17th and Clearfield Sts., Philadelphia, Pa.
Maryland Meter Works, Baltimore, Md.
Superior Meter Co., Bush Terminal Bldg., Brooklyn, N. Y.
Western Gas Construction Co., The, Fort Wayne, Ind.

RETORTS
Gas Machinery Co., Inc., The, Cleveland, Ohio.
J. H. Gautier & Co., Jersey City, N. J.
Harbison-Walker Refractories Co., Pittsburgh, Pa.
Improved Equipment Co., The, 24 State St., New York, N. Y.
Missouri Fire Brick Co., St. Louis, Mo.
Parker-Russell Mining & Mfg. Co., The, St. Louis, Mo.
Riter-Conley Co., Pittsburgh, Pa.
Russell Engineering Co., St. Louis, Mo.
West Gas Improvement Co. of America, 150 Nassau St., New York, N. Y.

ROOFING
Johns-Manville, Inc., Madison Ave., and 41st St., New York, N. Y.

ROOF CEMENTS
Johns-Manville, Inc., Madison Ave. and 41st St., New York, N. Y.

RUST PREVENTIVE
Superior Laboratories, Grand Rapids, Mich.

SAFETY DEVICES (Gas Masks, Oxygen Breathing Apparatus, etc.)
Langmotor Corp., 711 Boylston St., Boston, Mass.
Frank G. Jones, 3643 Beaubien St., Detroit, Mich.
Mine Safety Appliances Co., Pittsburgh, Pa.
Protecto Safety Appliance Co., 50 Columbia St., Newark, N. J.

SCRUBBERS
American Gas Construction Co., Newton, Ia.
Bartlett Hayward Co., The, Baltimore, Md.
Davis & Farnum Mfg. Co., Waltham, Mass.
Foundation Oven Corp., Woolworth Bldg., New York, N. Y.
Gas Engineering Co., Ingram Ave., Trenton, N. J.
Gas Machinery Co., Inc., The, Cleveland, Ohio.
Improved Equipment Co., The, 24 State St., New York, N. Y.
Isbell-Porter Co., Newark, N. J.
Koppers Co., The, Pittsburgh, Pa.
National Machine Works, Sheffield & North Aves., Chicago, Ill.
Riter-Conley Co., Pittsburgh, Pa.
Russell Engineering Co., St. Louis, Mo.
Stacey Bros. Gas Construction Co., The, Cincinnati, O.
Stacey Manufacturing Co., The, Cincinnati, O.
Steere Engineering Co., Detroit, Mich.
U. G. I. Contracting Co., The, Broad & Arch Sts., Philadelphia, Pa.
Western Gas Construction Co., The, Fort Wayne, Ind.

SELLING AGENTS
Frank G. Jones, 3643 Beaubien St., Detroit, Mich.
J. M. Sherwood Co., 154 Chambers St., New York, N. Y.
Kidde & Co., 103 Park Ave., New York, N. Y.

SERVICE BOXES, CLAMPS, Etc.
Davis & Farnum Mfg. Co., Waltham, Mass.
Grinnell Co., Inc., Providence, R. I.
Hays Mfg. Co., Inc., Erie, Pa.
H. Mueller Mfg. Co., New York, N. Y., Decatur, Ill.

SERVICE VALVES (Gate Valves)
Ludlow Valve Mfg. Co., The, Ft. Adams St., Troy, N. Y.

SPECIALS—CAST IRON
National Machine Works, Sheffield & North Aves., Chicago, Ill.
Western Gas Construction Co., The, Fort Wayne, Ind.

STEAM ENGINES (Uni-flow and Counter-flow)
Harrisburg Foundry & Machine Works, Harrisburg, Pa.

STEAM TRAPS
Johns-Manville Inc., Madison Ave. & 41st St., New York, N. Y.
B. F. Sturtevant Co., Inc., Boston, Mass.

STILLS (Benzol, Toluol)
Bartlett Hayward Co., The, Baltimore, Md.
Foundation Oven Corp., Woolworth Bldg., New York, N. Y.
Koppers Co., The, Pittsburgh, Pa.
Western Gas Construction Co., The, Fort Wayne, Ind.

STOPPERS (Gas Main)
Safety Gas Main Stopper Co., 523 Atlantic Ave., Brooklyn, N. Y.

STOVES (Confectioners, Laundry, Tailor)
American Stove Co., St. Louis, Mo.
A-B Stove Co., Battle Creek, Mich.
Geo. M. Clark & Co. Div., Chicago, Ill.
Wm. M. Crane Co., 16 W. 33d St., New York, N. Y.
Elgin Stove & Oven Co., Elgin, Ill.
Fuller-Warren Co., The, Milwaukee, Wis.
General Gas Appliance Co., The, 103 Park Ave., New York, N. Y.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Geo. D. Roper, Corp., Rockford, Ill.

STRUCTURAL STEEL WORKS (See Holders)

TANKS (Ammonia, Oil, Water)
American Gas Construction Co., Newton, Ia.
Bartlett Hayward Co., The, Baltimore, Md.
Cruse-Kemper Co., Ambler, Pa.
Davis & Farnum Mfg. Co., Waltham, Mass.
Gas Engineering Co., Ingram Ave., Trenton, N. J.
Gas Machinery Co., Inc., The, Cleveland, Ohio.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Metcalfe-Shaw Corp., 1304 Flatbush Ave., Brooklyn, N. Y.
National Tube Co., Frick Bldg., Pittsburgh, Pa.
Riter-Conley Co., Pittsburgh, Pa.
Stacey Bros. Gas Construction Co., The, Cincinnati, O.
Stacey Manufacturing Co., The, Cincinnati, O.
Steere Engineering Co., Detroit, Mich.
Western Gas Construction Co., The, Fort Wayne, Ind.

TAR DEHYDRATION
Metcalfe-Shaw Corp., 1304 Flatbush Ave., Brooklyn, N. Y.
Sharples Specialty Co., The, New York, N. Y.

THERMOMETERS
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Elgin Stove & Oven Co., Elgin, Ill.
Foxboro Co., Inc., The, Foxboro, Mass.
Gas Engineering Co., Ingram Ave., Trenton, N. J.
Gas Machinery Co., Inc., The, Cleveland, Ohio.
Grinnell Co., Inc., Providence, R. I.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Superior Meter Co., Bush Terminal, Brooklyn, N. Y.
Taylor Instrument Cos., Rochester, N. Y.
Schaeffer & Budenberg Mfg. Co., The, Brooklyn, N. Y.
Western Gas Construction Co., The, Fort Wayne, Ind.

THERMOSTATS
Bryant Heater & Mfg. Co., The, Cleveland, Ohio.
Claus Automatic Gas Cock Co., Milwaukee, Wis.
Gas Machinery Co., Inc., The, Cleveland, Ohio.
Frank G. Jones, 3643 Beaubien St., Detroit, Mich.
Kidde & Co., 103 Park Ave., New York, N. Y.
Minneapolis Heat Regulator Co., Minneapolis, Minn.
B. Ryan & Co., 372 W. 15th St., New York, N. Y.
Van Zandt Gas Appliance Co., 4050 Olive St., St. Louis, Mo.
H. A. Wilson Co., The, 97 Chestnut St., Newark, N. J.

THERMO VALVES
Claus Automatic Gas Cock Co., Milwaukee, Wis.
Pittsburg Water Heater Co., Pittsburgh, Pa.
Robertshaw Thermostat Co., Youngwood, Pa.
H. A. Wilson Co., The, 97 Chestnut St., Newark, N. J.

THORIUM
Welsbach Co., Gloucester, N. J.

TRENCH WORK
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.
Safety Gas Main Stopper Co., 523 Atlantic Ave., Brooklyn, N. Y.

TURBINE (Steam)
L. J. Wing Mfg. Co., 362 West 13th St., New York, N. Y.
B. F. Sturtevant Co., Inc., Boston, Mass.

VALVES
Aws Mfg. Co., The, 398 Harman St., Brooklyn, N. Y.
Bartlett Hayward Co., The, Baltimore, Md.
Bryant Heater & Mfg. Co., The, Cleveland, O.—Chicago, Ill.
Claus Automatic Gas Cock Co., Milwaukee, Wis.
Connelly Iron Sponge & Governor Co., 227 Fulton St., New York, N. Y.

(Continued on page 698)

Address of the Chairman

A. P. POST

THE Chairman of each Section was urged by Mr. Barnum at the beginning of the present administration to concentrate upon a few important activities, rather than undertake work too diverse in character. "Make genuine headway in a limited field," he said, in effect, "rather than merely keep the general routine sectional work going."

"Sales" was adopted as the theme most expressive of the field in which the Commercial Section could make its influence felt, and accordingly the Sales Stimulation Committee was appointed. That committee went to work on the same day it was created. It outlined definite steps for the guidance of commercial men in the exploitation of defiinite appliances, and by separate pamphlet, articles in the Association Monthly, articles in the Trade Journals and by direct correspondence between headquarters and members, it pounded all year in the effort to accelerate action. Response from the membership has been gratifying from the beginning.

The idea of regarding automatic hot water as the greatest unsold market for gas for domestic use, was successfully sold to the industry. Its original announcement received immediate response. Editorial support in the trade press, recognition of the subject in the programmes of state and district gas association meetings, cooperation from manufacturers,—all these combined to strike home the fact that companies have here in this one field alone, an opportunity for doubling their gas output. The Executive Board gave its weight and influence to the movement, interest in which is now universal.

The interest in gas for industrial purposes has been similarly stimulated. The Industrial Sales Committee throughout the year has supplied Association headquarters with concrete data and illustrations pertaining to specific installations. This material has been published in the American Gas Association *Monthly*, each issue, and has brought to the Association headquarters many inquiries for further help which Mr. N. T. Sellman, Industrial Engineer, has supplied.

During the year the section compiled and published an attractive thirty-one page booklet on Window Displays which was made available to members of the Association, and in conjunction with the Publicity and Advertising Section a merchandising advertising copy service has been started as of October 1st. This service will be supplied at $60.00 per year and consists of eight pieces of gas merchandise copy, fully illustrated, one good-will advertisement and four "Chat Ads" each month. To date 200 gas companies are subscribers to this service which it is hoped will lead member companies to adopt broader and more liberal advertising policies.

Arrangements have been made with

the American Institute of Architects, whereby committee of that Association will confer jointly with a committee of the Commercial Section on matters of mutual interest. The result it is hoped, will bring about better understanding between the gas companies and architects, and lead to helpful cooperation between them.

The subject of gas lighting was taken up as the season for it arrived. A survey has been made to determine how generally gas companies are still interested in holding and increasing gas lighting business. The responses were such as to indicate surprising interest in the subject. The Section Chairman accordingly addressed a communication to all member gas companies urging them to pay greater attention to this class of business. Many encouraging replies were received—in many cases the companies announced their decision to make every effort possible this fall and winter to build up their lighting load.

From every indication which has reached the Association Headquarters it is felt that the gas industry is thoroughly in accord with the policy of intensive merchandising, and with such policy now so well established the section feels well repaid for having participated in this year's work.

Install Gas Piping on All New Jobs

One of the Best Unworked Fields in the Building Trades

"H. L. D." Mercer, Pa.

There is in the gas industry a renewed interest in the subject of closer cooperation between the gas companies and the plumbing trade and the following article which appeared in the Plumbers Trade Journal of Sept. 1, 1922, will be of timely interest to our membership. (EDITOR'S NOTE).

NOT so many years back, I was associated with a plumbing contractor in the middle west. A very substantial part of our work was "piping for gas." Rarely, if ever, did a new job go in without our making a nice profit out of providing gas outlets for portable heater connections and bracket lights, and in many cases, ceiling outlets.

What has become of the gas fitting business formerly enjoyed by the plumbing trade? Where has it gone, and why? How many homes under construction this year are being fitted with gas piping other than merely a range connection?

The answers to these questions vary in different localities, but from a national standpoint it is safe to say that the gas piping business from the plumber's standpoint has gone—but where has it gone? Certainly not to a competitive branch of industry with the possible exception of the center ceiling outlet which the electrical men have taken (and no doubt justly so), but rather the gas piping business and its profits have gone because we, the plumbing trade, have made no effort to keep it. We have sent it away, rather than its having left us.

Right now I want to say that this is

in no sense a plea for the return of the gas lighting business.

However, it is well to keep in mind that electric service sometimes fails and it is very highly desirable to have some sort of auxiliary lighting service available.

You all know that in building up an industry and creating a demand for anything, a tremendous amount of capital and energy are expended, and generally speaking, men engaged in any business, fight like the very dickens when the life of any part of their business is threatened by other men, or by conditions made by other men.

As long as the need for a thing or service continues, certainly a demand for that thing or service can be created and kept alive, after creation, by very little effort.

Certainly all older plumbing contractors—plumbers as well—are more or less familiar with the fact that a pile of money was spent to popularize the gas lighting business, to say nothing of gas heating. We all must appreciate that the need for an emergency supply of energy for lighting, when electric service fails, is just as great as ever, and that the need of auxiliary heating appliances is greater than ever.

We certainly have overlooked a "pile of bets" in so far as gas piping is concerned, but the greatest single outstanding feature of our negligence was to take it for granted that when electric lighting became so popular there was no need for any gas piping in a house other than a service which terminated at the kitchen range.

Nothing could be further from the truth. Now more than ever before from the user's standpoint, gas service for auxiliary heating is a necessity, and it is going to be increasingly important as the years go on for many reasons, one of which is the uncertainty of the coal supply, in so far as it affects the small consumer.

Every now and then electric service is interrupted and when this occurs, the "lights go out." In a case of this kind, every one will cheerfully admit the need of emergency lighting service, and the best possible means for providing that service is gas.

This is not a strained effort to solicit any one's aid in bubble-blowing. With all of the many ideas advanced to build up a greater business for the plumber it seems well to give some thought to business lost or disregarded in recent years, which can be had again by putting forth a very little intelligent effort.

The majority of plumbers have a very good standing with their local architects, and the architect is bound to be impressed with the fact, and when he is told that it is a good thing for the home owner to have his house piped for gas, he will, in turn, pass the information on to his principals, with the result that more gas piping will be specified.

If the plumber will tell the prospective home builder that it will be well to include gas piping in his plans for the new home, and tell him why—it will mean more money for the master, more work for journeymen, and a better all around satisfied customer.

After all, why let this highly profitable field go disregarded and unthought of? Surely more business is desirable and certainly some business can be had, which is now passed up, in gas piping.

Let us consider some facts and figures

in connection with securing this business:

For rough calculation on half-inch and three-quarter inch pipe, let's consider that it costs on the average $.06 per foot and, for an ordinary six room cottage, it will take 25 feet of assorted size pipe, then the cost of pipe will be $9.00.

Say that a job of this kind requires the labor of a journeyman and an apprentice for one full day, or labor cost of approximately $12.00.

It will take 30 fittings, say at least $.12 each, or $3.60 for fittings, or a total cost of material and labor of $24.60.

Figuring an overhead of 15% and a profit of 25% would make this job cost the customer $32.96.

These figures are in no sense given to show how to figure a job and I've "figured high" on the basis of local prices with the idea in mind of showing that even at a good fair price for a gas piping job, the amount it will cost the customer considering the benefit he derives is trivial.

Calculating this thing on a purely economic basis let's see what happens.

Say the gas piping job of a six room house costs the customer $35.00. Figure that coal on an average costs the customer $7.00 per ton. Consider that the gas service aside from cooking will be used mainly for auxiliary and emergency heating. Proceeding.

There are about three and one-half months in the year when some heat is needed in a home, but not sufficient to justify firing up the furnace. In the majority of homes the family congregate in one room around one fire; say that a heater is used to "take the chill off" two hours in the morning and four hours at night, or to be extra liberal in our calculations, eight hours per day.

A heater which will comfortably warm a 10 x 12 x 9 room will consume around twenty feet of gas per hour, or in eight hours, 160 cubic feet ,and in three and one-half months, or roughly 100 days, it will use 16,000 cubic feet of gas which, at $1.00 per M (national average) will cost $16.00.

A furnace burning coal during the merely chill period of the year will use at least one ton of coal per month which at $7.00 per ton would cost for the 100 day period 3½ x $7.00, or $24.50.

While it is true that the coal fired plant would warm the entire house, it is by no means desirable that this be done when an equally satisfactory result can be obtained by warming one room (with gas).

So by having auxiliary gas heating service in a home it is readily seen that the occupant will save, roughly, $8.50 per season in his fuel bills, or almost enough to pay for his gas piping job in four years.

These figures lean toward the "case of coal," and do not represent anything like the saving which could be effected by carefully watching and working the auxiliary apparatus.

So far, we have not taken into account the most important phase of the heating situation, which is the matter of convenience; it is worth a great deal to a home occupant to have "heat on tap" whenever he wants it, as an example, for the bedroom in the morning—for the sickroom when needed—for the bathroom—and so on.

The very idea of building a house or an apartment house without piping it for gas—the more you consider this

thing, the stronger the case of gas piping presents itself. It matters not a whit from which angle this subject is viewed, there is not a single good reason why gas piping for auxiliary heating alone is not a most desirable thing.

Do you believe what I'm writing, fellows? Do you think that other people will believe you when you tell them about it? Of course you do, and you must realize that with the whole truth on your side, you can get every home owner to install gas piping service.

Let me tell you something—gas lighting service has largely gone by the board because men tried to sell it on the basis of cheap service, instead of a reliable convenience. I know, because circumstances beyond my control have forced me to fight against gas service, as well as fight for it.

There are all kinds of people, but they are divided into major classes from a domestic standpoint, one class which wants a thing merely because it offers a service for the least possible money, but by far the largest class is composed of those who want a thing or service, regardless of cost, which offers a greater convenience.

This is absolutely true. One of the largest manufacturers in the country of a specialty retailing at $250.00, which article through its use enables one to save around 40% of the amount it would take to duplicate a result which it produces, tells me that if they were to base their selling arguments on economy of operation, they would absolutely go broke in less than a year. Their president told me that they were able to put it over on one basis only, i.e., that of its offering a greater convenience.

Electric lighting has been put over on a convenience basis—no doubt in the world about it. People want it because it is convenient, and by this same token you can sell them gas piping service for auxiliary heating and emergency lighting, because it most assuredly is convenient, to say nothing of economy.

I would recommend that when talking to a prospective purchaser of gas piping service that the unfaltering reliability of gas service be stressed—its all around desirability be featured, instead of hammering on its cheapness. Make gas piping service appear to your customer as a most desirable and convenient thing to have—then you will sell him.

Now—how are we going to get this business in a big way? Here are some suggestions: *Let's have a national gas piping week, participated in by every plumber in the country:* let's decorate the windows with a sign reading: "Pipe your house for gas service when you build—come in and we'll tell you why." Let's all of us, the manufacturer, jobber, master plumber and journeyman plumber's organizations appropriate a fund for national advertising in which is featured the many points of convenience and advantage to be had through gas piping service. Let's talk it to the architect, let's talk it to every one, let's all of us join hands and heads and bring back the gas piping business.

Because it will mean more profit to all of us, and last, because we'll be doing our duty to the public, and we'll have a bigger, finer, happier crowd of friends amongst our customers.

Get in on this thing, fellows; it represents the biggest unworked field in the world.

Gas Fuel for Stereotype Furnaces

The above picture shows two 8-Ton Junior Autoclave Stereotype Casting Machines

Maximum Production .....Six 82-lb. Plates per minute
Gas Consumption per Plate .....12 Cubic feet
Average Production.....3 Plates per minute
Average Gas Consumption.....21 Cubic feet per Plate

These figures are based on 535 B.T.U. Gas.

Average Gas Bill—500,000 cu. ft. per mo. per furnace

Detailed information on file at A. G. A. Headquarters.

TECHNICAL SECTION
F. C. WEBER, Chairman H. C. WEHNERT, Vice-Chairman
H. W. HARTMAN, Secretary

Address of the Chairman

C. N. CHUBB

THE organization of the personnel of the technical section was started immediately by the chairman and vice-chairman elected at the 1921 convention. Excellent co-operation was received from all sources so that the chairmen of important committees were appointed, the personnel of these committees made up, and the work assigned at once. If the work of the section this year has been successful it is due to the assistance of the vice-chairman, to the chairmen of the important committees, to the men who have prepared papers, to the assistance received from association headquarters, and to the members of the association who have been asked to co-operate.

The section found many things that association members were interested in and endeavored to have the year's work cover subjects of the most universal interest. A great deal of work has been done, although some of the subjects suggested were of necessity omitted.

Some of the work that has been in progress during the past has been finished this year. Some subjects taken up this year have been completely covered while other subjects will be treated in the way of "progress reports."

The section was unable to report on one important subject, GAS HEAT APPLICATION, an investigation of which was requested by the executive committee early in the year. This subject is important to the gas fraternity as a whole, and especially to industrial gas salesmen and engineers, as it would place before them all available data which will help them to secure the business which properly and economically belongs to the gas industry. This request of the executive committee was prompted by the propaganda (if it may be so called) with which the electrical interests are flooding the country. This propaganda not only is often misleading to the general public, but it tends to inaugurate electric heat application, which, from an economic standpoint, should be gas heat application. This condition must be met, not by any comparison of gas vs. electric heat application but by the proper education of the public and of our industrial salesmen. This matter is of as much interest to the commercial section as to the technical section, and has been given consideration by both sections during the past year. Some definite program should be worked out next year in this connection.

Early in the year the executive committee of the Association requested the chairmen of the different sections to attempt to concentrate on a few important subjects this year, to have them thoroughly presented at the convention, and to give plenty of time for their discus-

sion. Following this recommendation the technical section has outlined its program so that no parallel sessions would be held. When this decision was announced early in the year, there was considerable criticism and objection from association members who have always been active in association work. It is true that in the short time allowable, all subjects that have received attention during the past year cannot be presented at the meeting; and although all papers and reports which are not on the program will be published in the *Monthly*, and will be considered a part of the proceedings, unfortunately we will lose a discussion on these papers and reports. Last year we had parallel sessions; this year we do not. I wish members would study the result of the single sessions this year and be ready at the final session on Thursday afternoon to express their opinions for and against parallel sessions so that the incoming chairman may lay out next year's program to suit the majority.

Papers and reports that we have arranged to present have been published in advance and have been available to association members. Some of these, due to their length, have been abstracted for presentation. I trust that those interested in any particular subject will take pains to read the complete report of the paper and will be ready to discuss it upon its presentation.

The technical section feels that mutual benefit might be received from better cooperation with affiliated association representatives. This matter was discussed at several of the technical section meetings during the year and finally it has been arranged through association headquarters to have a meeting, during this convention, of the secretaries of affiliated associations in order to devise ways and means to get more active cooperation between the different sections of the association and the affiliated representatives from other associations.

A man has no more right to say an uncivil thing, than to act one; no more right to say a rude thing to another, than to knock him down.

—*Johnson*

Rational Substitution of Manufactured Gas and Coke for Natural Gas and Anthracite in Buffalo, New York[1]

GEO. S. BREWER, Assistant Fuel Engineer, U. S. Bureau of Mines, Pittsburgh, Pa.

THE CITY of Buffalo, New York, is at the present time confronted with a problem which confronts a number of other large cities of the country. On account of increasing demand and a uniform or even decreasing supply of natural gas, it is necessary to supplement this gas with some substitute which can be distributed by the present distribution system and used in appliances now installed. In other words, the problem is to supplement the supply of natural gas with a suitable type of manufactured gas.

The Bureau of Mines undertook the solution of this problem, because the situation in Buffalo is typical of many cities. The method of attack may perhaps be somewhat different than it would be if being studied by the engineers of the gas company, for the reason that the viewpoint of the two organizations is considerably different. After a careful analysis of the conditions, the Bureau is attempting to solve the problem by appliying equally sound engineering methods, and with a look toward the future, which is long and broad. It is not confronted by the operating details which would in many cases hamper the conclusions of engineers of the local gas company.

From information which has been collected, it would appear that the present method of augmenting the gas supply in Buffalo as in other cities, is the practice of mixing manufactured gas with the natural gas—this gas usually being coke oven gas—in quantities depending upon the available output of local coke ovens. The high heating value of natural gas and the relatively small proportion of coke oven gas required allows this to be done without violating any legal regulations in heating values. Also, the small percentage of manufactured gas usually necessary at present makes possible a mixed gas which does not fluctuate very greatly in specific gravity. If this method were carried to the extreme case of mixing large quantities of coke oven gas, the specific gravity would be materially changed, so that difficulty with appliances would be liable to occur. While all authorities do not agree on the extent to which a change in the specific gravity would affect the operation of appliances, it certainly seems highly desirable that the gravity be kept within reasonable limits, and that the heating value be kept as uniform as possible.

Considering the present stage of the gas industry, it would seem that the present available substitutes for natural gas are coal gas, blue water gas, or a mixture of these two. Oil gas in this section of the country seems to be out of the question, on account of the uncertainty of oil supply over a long term of years.

The production of coal gas or water gas is based on the gasification of cer-

[1]Approved by the Director, U. S. Bureau of Mines.

tain grades of bituminous coal. In order that gas may be manufactured economically, it is important that the by-products of gas manufacture be disposed of completely. The chief by-product is, of course, coke. The two methods of disposing of this by-product coke are: (1) its complete gasification; or (2) its use for domestic and other purposes as a substitute for anthracite or raw bituminous coal. As time goes on and the proportion of manufactured gas increases over natural gas, this problem of disposition of the coke will become more and more acute. It does not seem desirable at the present time to attempt a process which converts into gas all the coke which is a by-product of the coal gas process, whether made in coke ovens or retorts. There are two great objections to such a system. First, it assumes a winter heating load which would cause great fluctuations in demand, and second, it would yield a grade of gas of lower heating value than is desirable at the present time. Such a procedure would involve the installation of extremely large plants which would be able to carry the peak demand for gas during the winter months, when domestic heating would be done largely by the use of gas in household furnaces. Also, by using coke as domestic heating fuel, the supply of this by-product can be disposed of gradually as it accumulates and can be stored in the bins of the consumers for use during periods when the requirements for heat are extremely high. Thus a large storage capacity for potential heat is obtained at no additional cost and there will be no high capital charges for increased plant capacity in the form of higher gas rates. The disposition of this coke will, of course, depend on the education of the public to its use as a substitute for anthracite. To be sure, anthracite will be used by many consumers for many years to come, but the price of anthracite can never again be low, because of ever increasing operating costs inherent in the anthracite industry. In the natural gas areas it appears that this problem can be worked out gradually during the course of a number of years over which natural gas will still be available. This will allow time for the replacement of present distribution lines with lines of a capacity sufficiently large to carry gas of a lower heating value. What this value will ultimately be, it is impossible to foretell, but it seems certain that eventually it will be considerably below the present legal standards.

The problem seems to resolve itself, therefore, into the gradual substitution of coke for anthracite for domestic heating purposes, and the gradual change from natural gas, to mixtures of natural gas, coal gas, and blue water gas, which will in the end be essentially a mixture of coal gas and blue water gas carburetted with natural gas to such an extent that the legal heating standards will be maintained until such time as this standard is lowered, and that the specific gravity of the gas will be maintained within narrow limits during the course of the yearly fluctuations in demand. It has not yet been decided which type of coal gas plant will be the most desirable, but it will probably be either a by-product coke oven or a vertical retort plant, each of which have certain very decided advantages.

In order to determine the relative volumes of the three gases—natural gas, coal gas, and blue water gas—charts,

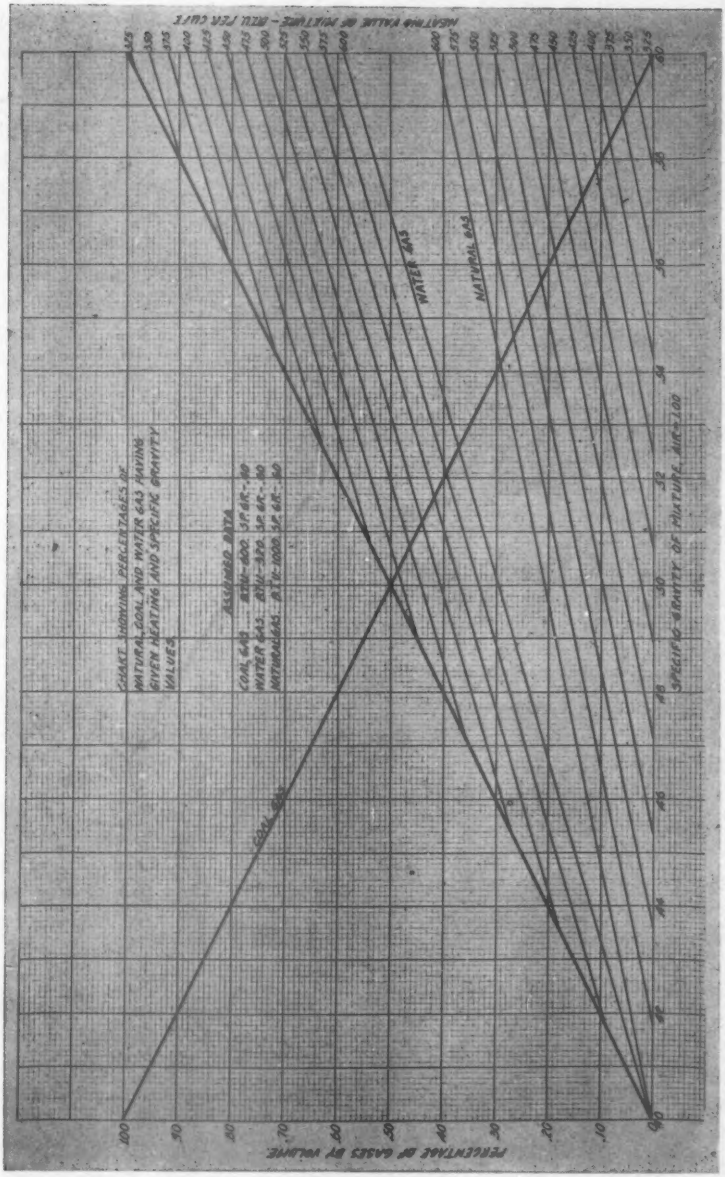
CHART SHOWING PERCENTAGES OF
NATURAL, COAL AND WATER GAS HAVING
GIVEN HEATING AND SPECIFIC GRAVITY
VALUES
ASSUMED DATA
COAL GAS B.T.U.=600 SP. GR.=.40
WATER GAS B.T.U.=300 SP. GR.=.80
NATURAL GAS B.T.U.=1000 SP. GR.=.60
COAL GAS
WATER GAS
NATURAL GAS
HEATING VALUE OF MIXTURE - B.T.U. PER CU. FT.
PERCENTAGE OF GASES BY VOLUME
SPECIFIC GRAVITY OF MIXTURE, AIR=1.00

Fig. 1

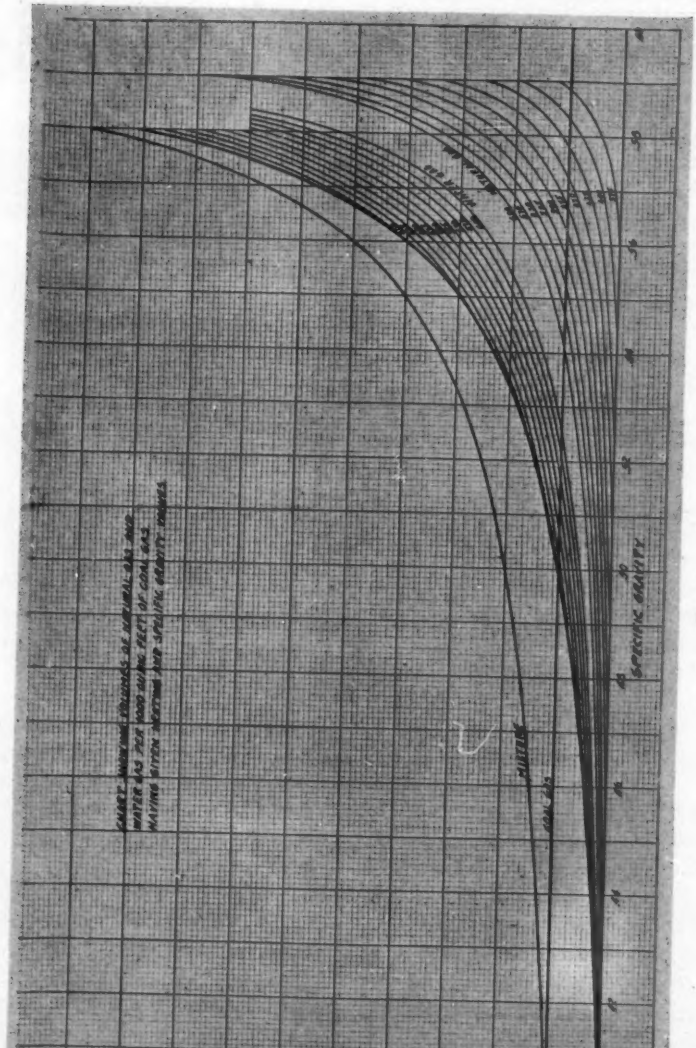

Fig. 2

figure 1 and figure 2, have been prepared, based upon chemical analyses of these gases and a mathematical relationship between their heating values and specific gravities, which show the percentage of the gases by volume, the heating value of the mixed gas, and the specific gravity of any desired mixture.

In constructing these curves, use has been made of the following points:

1. The high heating value of natural gas.

2. The low heating value of blue water gas.

3. The quite similar specific gravities of natural gas and blue water gas.

4. The desirability of keeping a coal gas plant, especially a coke oven, in continuous operation.

It is of course desirable to maintain upon the coal gas plant a demand which is as nearly uniform as possible. By mixing with this coal gas the requisite quantities of blue water gas and natural gas, the B.t.u. value and the specific gravity may be maintained within narrow limits. Thus, by the use of charts similar to those shown, any desired type of gas may be obtained by mixing proportions of the three gases, indicated by the intersection of the ordinate, corresponding to the gravity desired, with the coal gas line, and the corresponding water gas and natural gas lines designated by the total heating value of the mixture.

These charts have been based upon the following assumed heating values and specific gravity values from reliable sources but values which are by no means uniform in all plants:

Coal gas	B.t.u. 600,	Sp. gr. .40
Blue water gas	B.t.u. 320,	Sp. gr. .60
Natural gas	B.t.u. 1000,	Sp. gr. .60

(The B.t.u. value of the water gas may be a little high, but corresponds to the chemical analysis of the gas used.)

In constructing the curves, the following equations

$$\text{I. } c=\frac{G(b_n-b_w)-B(g_w-g_n)+g_nb_w+b_ng_w}{b_w(g_n-g_c)+b_n(g_c-g_w)+b_c(g_w-g_n)}$$

$$\text{II. } w=\frac{B-b_n-c(b_c-b_n)}{(b_w-b_n)}$$

$$\text{III. } n=1-w-c$$

Where B=B.t.u. value of mixed gas.
G=specific gravity of mixed gas, (air=1.)
c=volume of coal gas.
w=volume of water gas.
n=volume of natural gas.
g_c, g_w, g_n=specific gravity of coal, water and natural gases, respectively.
b_c, b_w, b_n=B.t.u. value of coal, water and natural gas respectively.

derived from the mathematical relationship between chemical composition, heating value, and specific gravity, have been solved and plotted.

It will be necessary, however, to construct similar charts for each individual case, depending upon the chemical analyses of the gases produced at any given plant. With the equations shown, it is possible to construct curves when the analyses of the gases, their heating values, and their specific gravities are known, from which any desired mixture may be predetermined.

The work at Buffalo is a new type of undertaking for the Fuel Section of the Bureau of Mines. There are many phases of it which must yet receive careful study. One of these points is the qualities of coke made in coke ovens and in vertical retorts, both without steaming and with steaming, and the merits of each for use as a domestic heating fuel.

Another point to be studied is the desirability of steaming continuous verticals as compared with their use without steam but in connection with a blue gas plant.

A third point is the use of intermittent verticals in connection with a blue gas plant in which the time of discharge of the retorts corresponds to the charging period of the blue gas set, using the hot coke from the verticals.

These are problems concerning which data must be collected from different sources, because most men familiar with one type of plant have not had such extended experience with the other types. The author would be very pleased to have these points discussed and believes such discussion would be valuable and interesting to many engineers besides himself.

(Continued from page 684)

Gas Machinery Co., Inc., The, Cleveland, Ohio.
Grinnell Co., Inc., Providence, R. I.
Improved Appliance Co., The, 419 Kent Ave., Brooklyn, N. Y.
Improved Equipment Co., The, 24 State Ct., New York, N. Y.
Isbell-Porter Co., Newark, N. J.
Ludlow Valve Mfg. Co., The, Troy, N. Y.
National Machine Works, Sheffield & North Aves., Chicago, Ill.
Stacey Manufacturing Co., The, Cincinnati, O.
Steere Engineering Co., Detroit, Mich.
Western Gas Construction Co., The, Fort Wayne, Ind.

VALVES (Needle Valves for Gas Stoves)
Acme Brass Works, Detroit, Mich.
Claus Automatic Gas Cock Co., Milwaukee, Wis.
Detroit Brass & Malleable Works, Detroit, Mich.
Peninsular Brass Works, Detroit, Mich.
McRae & Roberts Co., The, Detroit, Mich.
Roberts Brass Mfg. Co., The, Detroit, Mich.

WASHING MACHINES
Detroit Washing Machine Corp., Detroit, Mich.
"1900" Washer Co., The, Binghamton, N. Y.

WATER HEATERS
A-B Stove Co., Battle Creek, Mich.
Baltimore Gas Appliance & Mfg. Co., The, Baltimore, Md.
Bartlett & Co., Inc., Philadelphia, Pa.
Bastin-Morley Co., La Porte, Ind.
Bryant Heater & Mfg. Co., The, Cleveland, O.
Geo. M. Clark & Co., Div., Chicago, Ill.
Cleveland Heater Co., The, Cleveland, O.
Abram Cox Stove Co., Philadelphia, Pa.
Wm. M. Crane Co., 16 W. 32nd St., New York, N. Y.
Detroit Stove Works, Detroit, Mich.
Elliott Water Heater Co., Inc., Brooklyn, N. Y.
Estate Stove Co., Hamilton, O.
General Gas Appliance Co., 103 Park Ave., New York, N. Y.
Go-Ro, Incorporated, New Orleans, La.
Hoffman Heater Co., The, Lorain, O.
Humphrey Co., Div., Kalamazoo, Mich.
Frank G. Jones, 3643 Beaubien St., Detroit, Mich.
Wm. Kane Mfg. Co., Inc., 1903 Hagert St., Philadelphia, Pa.
Kidde & Co., 103 Park Ave., New York, N. Y.
Kompak Company, The, New Brunswick, N. J.
Lawson, Mfg. Co. Pittsburgh, Pa.
Lovekin Water Heater Co., The, 39 Laurel St., Philadelphia, Pa.
Michigan Stove Co., The, Detroit, Mich.
New Process Stove Co., Div., Cleveland, O.
Peninsular Stove Co., Detroit, Mich.
Philadelphia Stove Co., Philadelphia, Pa.
Pittsburg Water Heater Co., Pittsburgh, Pa.
Rathbone, Sard & Co., Albany, N. Y., Aurora, Ill.
Reliable Stove Co., Div., Cleveland, O.
Geo. D. Roper Corp., Rockford, Ill.
B. Ryan & Co., 372 W. 15th St., New York, N. Y.
Ruud Mfg. Co., Pittsburgh, Pa.
Sands Mfg. Co., The, Cleveland, O.
Trenkamp Stove & Mfg. Co., The, Cleveland, O.
Van Zandt Gas Appliance Co., 4050 Olive St., St. Louis, Mo.
Wales Co., The, Kalamazoo, Mich.

WATER STILLS (Gas Heated)
Improved Appliance Co., The, 419 Kent Ave., Brooklyn. N. Y.
Young Bros. Co., Detroit, Mich.

WELDED STEEL PIPE
Bartlett Hayward Co., The, Baltimore, Md.
Steere Engineering Co., Detroit, Mich.
Western Gas Construction Co., The, Fort Wayne, Ind.

WELDING
American Gas Furnace Co., Elizabeth, N. J.
S O S Welding Corp., 235 Sixth St., Brooklyn, N. Y.

Conditions Affecting the Activity of Iron Oxide in Gas Purification[1]

W. A. DUNKLEY, Gas Engineer, U. S. Bureau of Mines,
Chairman, Purification Committee, A. G. A., and
R. D. LEITCH, Junior Chemist, Bureau of Mines, Urbana, Ill.

MUCH has been written relative to the details of gas purification practice and doubtless each operator is convinced that a certain combination of conditions is most favorable to good purifying results in his particular plant. Each operator usually has his favorite brand of purifying material, also, and believes that under conditions existing in his plant a certain oxide gives better results than do others. Another operator with his peculiar plant conditions would perhaps prefer a different oxide.

It is evident that reaction between iron oxide and hydrogen sulphide, being a chemical reaction, may reasonably be expected to be affected by such conditions as temperature, pressure, moisture, concentration of the reacting agents and their reaction products, acidity and alkalinity, and possibly by the presence of substances which promote or retard the action without themselves entering into it, viz. catalyzers or anti-catalyzers. Under usual gas purifying conditions, some of these influences are doubtless more potent than others, but it is very difficult in plant operation to so completely eliminate the effects of all but one particular condition at one time, so that the particular effect of that one condition can be definitely determined. Even in the laboratory, control is not always easy but it is much more so than in the plant. In carrying out the work discussed in this article the effort was made to study one condition at a time, eliminating the effects of all others as far as possible and at the same time use methods which did not introduce conditions radically different from those found in plant practice.

The first consideration was to find an oxide testing method which would be subject to control. Most of the laboratory methods heretofore suggested have made use of concentrated H_2S. The reaction between H_2S and iron oxide is heat producing and therefore it was to be expected that, if oxides were tested with pure H_2S, there would be more heat liberated than could be immediately dissipated, hence, the temperature of the oxide would rise and the effect of temperature would enter in ragardless of whether this was the variable under consideration or not. It was decided, therefore, to use purified gas containing H_2S in dilutions comparable with purification practice. It was realized from the start that all the properties of oxide under all conditions from the time it was freshly made until it was discarded, could not be covered in one series of experiments and it was decided, therefore, to confine the present study to the activity of oxides, chiefly when in the fresh condition. The measurement of activity adopted was somewhat arbitrary in the absence of any standard method or prac-

[1]Abstract of a report of cooperative work with the Engineering Experiment Station of the University of Illinois and the Illinois State Geological Survey, published with permission of the Director of the Bureau of Mines and the approval of the cooperating agencies.

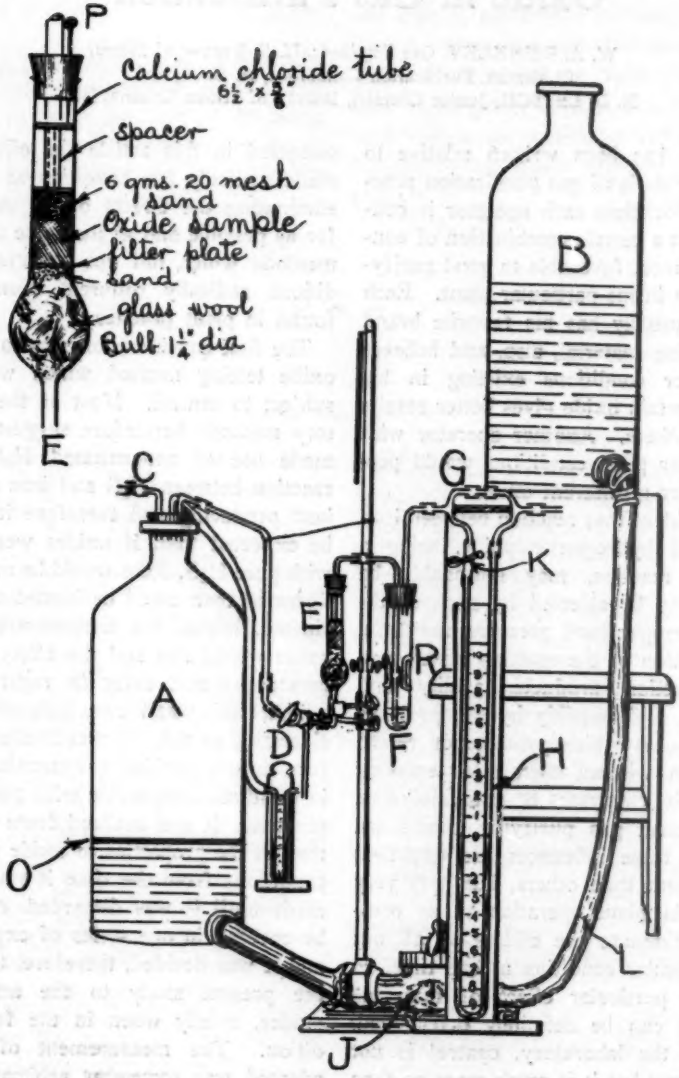
P
Calcium chloride tube
6½" × 5/8"
spacer
6 gms. 20 mesh sand
Oxide sample
filter plate
sand
glass wool
Bulb 1¼" dia
E
C
G
B
K
E
R
A
D
F
H
O
L
J

Fig. 1

tice. It was taken as the maximum rate at which the gas containing H_2S could be passed through a specified weight of oxide, packed in a tube under prescribed conditions, with complete removal of the H_2S from the gas by the oxide. Space does not permit a very detailed description of the apparatus and procedure. The apparatus employed, which was designed by Messrs. Fieldner, Powell, and Scott of the Bureau of Mines and modified in some details by the authors of this article, is shown in Fig. 1. Briefly stated the H_2S gas mixture is stored in bottle A over water upon which floats a layer of heavy paraffin oil. Bottle B, elevated at any desired height, is connected with A through the ¾ inch rubber tube L. The height of B is best arranged so that it can be varied, thus giving in conjunction with the ¾ inch cock J a regulation of the gas pressure in A. Gas leaving A passes through the reaction tube E which is filled as shown in the sketch at the upper left corner of Fig. 1. The oxide sample indicated there consists of 1 gram of oxide through a 20-mesh sieve mixed with about 2 grams of dry sawdust of the same mesh. In packing the tube, care was taken to rotate the tube about its vertical axis and drop the oxide-sawdust mixture around the inner wall of the tube. Very uniform packing was secured in this manner. The gas after passing through tube E goes into tube R containing about 10 cc. of 5 per cent solution of lead acetate, with very low H_2S concentrations a solution of potassium permanganate having a barely perceptible color was used. The lead acetate solution or permanganate solution acted as an indicator, giving a black coloration in the first case and being decolorized in the second case by traces of H_2S. Tube R was followed by a capillary tube G the terminals of which were connected with the water manometer tube H. The flow meter thus formed had been previously calibrated. In testing, bottle B and cock J were so regulated by a few trials that a bare trace of H_2S almost instantly passed tube E when cock J was opened. The instantaneous reading of manometer H gave the rate of gas flow corresponding to this end point. By reference to the calibration this rate was expressed in cubic feet of gas per hour, which was taken as the oxide activity.

Application of the Method of Oxide Samples

OXIDES TESTED

Several samples of oxide were used in the tests to be described.

These oxides were of several types as the following sample numbers indicated:

1. A black analine residue
2. A yellowish brown natural ore
3. A rusted borings oxide
4. A deep red material, possibly pyrite cinder
5. A yellowish brown oxide precipitated by limestone
6. A yellowish brown oxide from bauxite
7. A chocolate colored oxide from rusting iron, process unknown.

Effect of Moisture

Portions of each sample were moistened in varying degrees, other portions were dried in varying degrees. All portions were allowed to stand in tightly stoppered containers until equilibrium between water content and iron oxide content was established. Then the total water content and oxide content of each portion was determined. The activity of each portion was also determined.

It was observed that different oxides are affected differently by variations in water content. With each oxide there is a most favorable water content. If the water is increased or decreased from this favorable amount the activity falls. Some oxides are much more sensitive than others to water. A large amount can be added to some with little effect, others are affected by very small changes in water content. The activity seems to be a matter of surface. For action the surfaces must be moist but if too wet the H_2S is excluded in a measure and the activity decreases.

Effect of Temperature

The apparatus was rearranged so that the tube E was preceded by a spiral glass tube and both the spiral and tube E could be immersed in water at any desired temperature. Samples of oxide dried at 105 deg. C. were used. Temperatures were varied from 45 deg. F to 150 deg. F. There is no space to show the curves obtained but it may be said that all of the oxides tested showed the same temperature effect on activity. The activity increased from 45 degrees up to about 115 to 120 deg. after which there was an appreciable decrease in activity. The total increase in activity observed up to the maximum was approximately 10 per cent. In other words gas could be passed through the oxide about 10 per cent faster at 115 deg. F. than at 45 deg. F.

Effect of H_2S Concentration

The activity of oxides with different H_2S concentrations was studied by passing gas containing from 10 grains to 1000 grains of H_2S per 100 cu. ft. through air dried oxide samples and noting the maximum rate of flow in each case which would just cause a perceptible trace of H_2S to pass the oxide. A curve could be plotted for each oxide showing the activity at each concentration. These curves cannot be presented here, but it was found that in general all the curves had the same shape. All of the six oxides tested showed nearly the same activity with 10 grains of H_2S per 100 cu. ft. and this activity was higher than with higher concentrations. With increasing H_2S concentrations, the curves diverged. In general the material of lower iron oxide content suffered less decrease in activity with the higher concentrations than did those very high in iron. In most cases there was very little, if any, decrease in activity after a concentration of about 500 to 600 grains was reached, indeed some samples seemed to become slightly more active from about this concentration up to the limit of the tests, 1000 grains per 100 cu. ft. The most affected sample was able to purify gas containing 10 grains of H_2S about 2.5 times as fast as gas containing 600 grains H_2S per 100 cu. ft. On the other hand the least affected oxide could purify the gas of lower concentration only about 1.1 times as fast.

Effect of Previous Partial Fouling

It was realized that oxides which were most active when fresh might not hold their superiority when partially fouled. A number of portions of several oxides were therefore sulphided in different degrees by passing concentrated H_2S through the oxide tube followed by a calcium chloride tube as in the Kunberger test. The H_2S absorption was determined by gain in weight of the

tightly stoppered tubes. The oxide tube was then quickly placed in the apparatus of Fig. 1 and activity determined in the usual way. Various degrees of sulphiding from 0 to 85 per cent of the theoretical were tried. It was found that the behavior of different types of oxides was widely different. Some of the materials which were most active when fresh dropped off in activity very rapidly when partly fouled. The behavior of the various materials is shown in Fig. 2. It will be noted from this that initial performance is no sure indication of subsequent activity. The results given were obtained in absence of any oxygen so there was no revivification in place. Had air been present, it is possible that the revivification of some of the initially more rapid samples might have been fast enough to permit them to hold their places. In the curves of Fig. 2, No. 3 sample is conspicuous in its power to maintain a moderately high activity over a wide range of sulphiding. This may explain why iron borings oxides have found favor during many years, especially in many small plants where revivification in place has not been tried or has been given but little attention.

Effect of Acidity and Alkalinity

It was not possible, during the course of the experiments described, to go very thoroughly into the study of acidity and alkalinity, viz. to the extent of determining the effects of different acids and alkalies. Experiments were made using air-dried samples which had been treated with different amounts of sulphuric acid

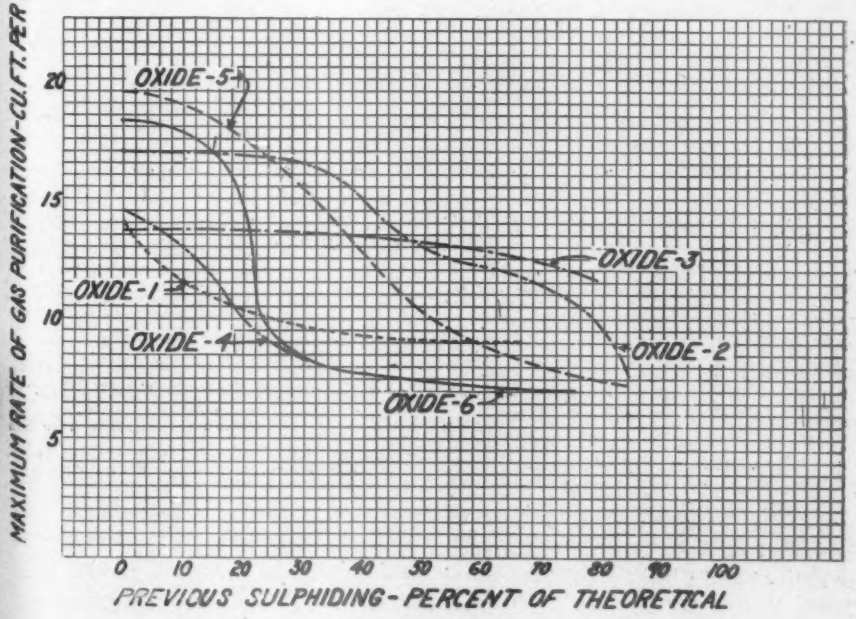

Fig. 2

up to 10 per cent and allowed to air dry for several days. It was found that those samples containing the larger amounts of acid tended to be slightly more active than those containing less sulphuric, but the difference may be attributable to the ability of sulphuric acid to hold moisture rather then to the actual effect of the acid.

Similarly samples of oxide treated with sodium carbonate solution and then air-dried showed little or no differences in activity attributable to the alkali, except the small absorbing action of the alkali itself for H_2S. While as indicated by certain researches which have been made, the presence of alkalies may cause the formation of iron sulphides which revivify more easily than those formed under acid conditions and consequently affect the later behavior of the oxides, the experiments do not indicate that acids or alkalies have any marked effect upon fresh materials.

The effect of pressure upon oxide activity has not been studied since the variations in practical operation are probably not large enough to have any appreciable effect.

The effects of catalysts and anti-catalysts present an interesting field for investigation but time for carrying out such a study has not been available.

Statement of Ownership

Statement of the Ownership, Management, Circulation, etc., Required by the Act of Congress of August 24, 1912

Of American Gas Association Monthly published Monthly at Brattleboro, Vermont, for October 1, 1922. State of New York. County of New York.

Before me a Notary Public in and for the State and county aforesaid, personally appeared Thomas Scofield who, having been duly sworn according to law, deposes and says that he is the Editor of the American Gas Association Monthly and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, American Gas Association, Inc., 342 Madison Ave., New York, N. Y. Editor, Thomas Scofield, 342 Madison Ave., New York, N. Y. Managing Editor, None. Business Manager, None.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.) American Gas Association, Inc. No stock issued.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is not required. (This information is required from daily publications only.)

(Signed) THOMAS SCOFIELD.

Sworn to and subscribed before me this 29th day of September 1922.

(Signed) EDGAR S. MURRAY.

(My Commission expires March 30, 1924.)

Employment Bureau

SERVICES REQUIRED

WANTED—Fitter who can do good work on installation of water heaters, ranges and who thoroughly understands Gas Company appliance work. Address A. G. A.
Key No. 01.

HIGH GRADE Industrial Sales Engineer wanted. Must be man having had factory experience and knowledge of house heating. Gas company in middle west has need of such a man and requests applicants to give full particulars of experience. Appointment for interview will be arranged. Address American Gas Association.
Key No. 0-3.

WANTED—Two men for eastern territory and one for middle west, who can earn not less than $100.00 PER WEEK supervising campaign crews, selling gas appliances of great market possibilities. Made by the best known manufacturer of gas appliances in the world. Permanent position. Must be hustlers of executive ability. Give full particulars as to present position and experience. Address: A. G. A.
Key No. 04.

WANTED—High class foreman for water gas plant now sending out two million a day. Must be good on plant construction and repair as well as operation. State fully age, experience and salary expected. Answers will be considered confidential. Address A. G. A.
Key No. 06.

WANTED—A high grade commercial man to handle commercial work in a Southern Gas Company in a town of 15,000 people. Must be capable of writing advertisements, arrange displays, and be willing to make a house to house canvass. Salary and commission basis of payment. Address A. G. A.
Key No. 07.

SERVICES OFFERED

WANTED—Position by a man of large general experience in gas business who has made a special study of sales promotion problems, and who would prove valuable as an assistant to a busy executive in any department. Address A. G. A.
Key No. 134.

GAS APPLIANCE SALESMAN—Especially trained in water and house heating; 15 years' experience; desires selling position, either road or local, with aggressive appliance manufacturer or gas company. Will furnish best selling reference. Drawing account against commission. Address A. G. A.
Key No. 125.

WANTED—Position of responsibility as Manager or Industrial Fuel Engineer—18 years varied experience in the gas business. References and service record furnished. Address A. G. A.
Key No. 142.

ENGINEER—Producing results in operating desires to make change, either as Engineer or Assistant Engineer of Works with output over 20,000,000 daily output. Or in Managing capacity. Address A. G. A.
Key No. 135.

WANTED—Position as executive in a local office of a gas or a combination gas and electric company. Have had a practical experience in all branches of commercial utility work. Have been successful in dealing with the public and promoting good will of utility companies. Educated in commercial and accounting methods as compiled by N. C. G. A. and N. E. L. A. Well acquainted in office routine and very exact on details and execution of same. Address A. G. A.
Key No. 114.

WANTED—Man of wide executive experience in gas accounting, statistics and system and a record of success in gas appliance merchandising, is now after illness of several years, prepared to sacrifice in size of salary if necessary to obtain exactly the sort of position he is looking for. Inquiries solicited. Address A. G. A.
Key No. 141.

POSITION WANTED—Technical graduate with some experience in all branches of combination, manufactured, and natural gas companies, but particularly as head of industrial and new business departments, desires responsible position with a future. Address A. G. A.
Key No. 140.

WANTED—Graduate Gas and Electrical Engineer—age 35, married. Technical degrees, B.S., M.S. & E.E. Associate member of A. I. E. E., member A. G. A. Nine years practical gas and electric public utility operation in responsible capacity. State Public Service Commission Engineer. Prefer work as Manager or Assistant Manager of gas or combination gas and electric property. Now in New York. Location anywhere. Best of references. Address A. G. A.
Key No. 143.

WANTED—Change in employment, where experience and sincere efforts may be better utilized and appreciated. Technical and with 18 years diversified experience in gas lines, having held positions of responsibility in manufacturing and distribution, in industrial fuel and in research engineering. Address A. G. A.
Key No. 144.

WANTED—Man 38 years of age with 20 years experience in both coal and water gas plants, would like to connect with some company, (preferably a small plant in New England) in the capacity of Manager, Superintendent, or Asst. to Superintendent. Best of references. Address A. G. A.
Key No. 145.

WANTED—Position as Assistant to Superintendent of either large coal or water gas plant, by young man twenty-five years of age who is now employed by combination coal and water gas plant in South. Experienced in calorimetry, statistics, plant records and general office work and would prove valuable to busy executive. Prefers Southern or Eastern territory, but will consider any location. Address A. G. A.
Key No. 146.

GAS ENGINEER wants position with holding company or large operating company, fifteen years' experience working directly under three successful managers with one of the most diversified Public Utility Companies in America. Experience includes design, construction and operation in all branches from coal mines to consumers' burners and rate structures. Address A. G. A.
Key No. 148.

GAS RESEARCH ENGINEER—Now employed by a Government technical bureau, would like position as Testing, Research, or Inspecting Engineer with a large gas company or a chain of gas properties. 37 years of age. Author of several Government, State and Technical journal reports on gas research problems. Active member of several A. G. A. technical committees. Has had several years of practical gas operating experience as chemist and superintendent in addition to gas investigative work. Address A. G. A.
Key No. 149.

YOUNG TECHNICAL GRADUATE with slight amount of gas experience and in valuation work wants position with gas company. Address A. G. A.
Key No. 150.

AMERICAN GAS ASSOCIATION, INC.

HEADQUARTERS 342 MADISON AVE., NEW YORK, N. Y.

Officers and Directors

PRESIDENT	R. B. BROWN	Milwaukee, Wis.
VICE-PRESIDENT	J. B. KLUMPP	Philadelphia, Pa.
SECRETARY-MANAGER	OSCAR H. FOGG	New York, N. Y.
TREASURER	H. M. BRUNDAGE	New York, N. Y.
ASS'T. TREASURER	W. CULLEN MORRIS	New York, N. Y.
SECTIONAL VICE-PRES.	F. C. WEBER	New York, N. Y.
SECTIONAL VICE-PRES.	Wm. GOULD	Boston, Mass.
SECTIONAL VICE-PRES.	F. A. LEMKE	Kalamazoo, Mich.
SECTIONAL VICE-PRES.	J. W. HEINS	Philadelphia, Pa.
SECTIONAL VICE-PRES.	B. J. MULLANEY	Chicago, Ill.

D. D. BARNUM	Boston, Mass.
GEO. B. CORTELYOU	New York, N. Y.
Wm. M. CRANE	New York, N. Y.
MARTIN B. DALY	Cleveland, Ohio
S. E. De FRESE	Chatanooga, Tenn.
J. S. De HART, Jr.	Newark, N. J.
CHAS. H. DICKEY	New York, N. Y.
H. L. DOHERTY	New York, N. Y.
L. R. DUTTON	Jenkintown, N. Y.
P. H. GADSDEN	Philadelphia, Pa.
ARTHUR HEWITT	Toronto, Can.
C. L. HOLMAN	St. Louis, Mo.
F. H. KNAPP	Pittsburgh, Pa.
A. B. MACBETH	Los Angeles, Cal.
CHARLES A. MUNROE	Chicago, Ill.
H. S. REESIDE	Washington, D. C.

Section Officers

ACCOUNTING—Chairman	J. W. HEINS	Philadelphia, Pa.
Vice-Chairman	W. A. SAUER	Chicago, Ill.
Secretary	H. W. HARTMAN	Ass'n Headqtrs.
ADVERTISING—Chairman	B. J. MULLANEY	Chicago, Ill.
Vice-Chairman	J. M. BENNETT	Philadelphia, Pa.
Secretary	C. W. PERSON	Ass'n Headqtrs.
COMMERCIAL—Chairman	Wm. GOULD	Boston, Mass.
Vice-Chairman	J. E. DAVIES	Chicago, Ill.
Secretary	LOUIS STOTZ	Ass'n Headqtrs.
MANUFACTURERS—Chairman	F. A. LEMKE	Kalamazoo, Mich.
Vice-Chairman	G. W. PARKER	St. Louis, Mo.
Secretary	C. W. BERGHORN, Jr.	Ass'n Headqtrs.
TECHNICAL—Chairman	F. C. WEBER	New York, N. Y.
Vice-Chairman	H. C. WEHNERT	St. Louis, Mo.
Secretary	H. W. HARTMAN	Ass'n Headqtrs.

SECRETARY-MANAGER	OSCAR H. FOGG	Ass'n Headqtrs.
ASS'T SECRETARY-MANAGER	LOUIS STOTZ	Ass'n Headqtrs.